THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXV. No. 619.] LONDON, MARCH 23, 1875. [27TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis—10,000 cubic feet of gas per ton of coal: 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
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GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1894. FIRE-CLAY SANITARY PIPES. CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
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GENUINE TORBAY PAINT
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FOUR PRIZE MEDALS.
WORKS: BRIXHAM, TORBAY.
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
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FOR
PURIFIERS & SCRUBBERS
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WELL-SEASONED PLANKS.
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JOSEPH COWEN and CO.,
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Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and other OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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RETORTS SET, AND GUARANTEED TO BURN OFF A CERTAIN AMOUNT OF COAL, OR ELSE NO MONEY TAKEN FOR THE CONTRACT.
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Retort-Setters sent to all parts of Europe and America.
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DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
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G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

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AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

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BY

OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

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THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

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LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

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GAS-FITTERS TOOLS, VALVES, COCKS, &c.

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PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

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EITHER BLACK, GALVANIZED, OR ENAMELLED HOT WATER TUBES AND FITTINGS,
CORE BARS, COILS, COCKS (IRON OR BRASS),
CHANDELIERS, &c., GAS-FITTERS' TOOLS, GAS TONGS, STOCKS, TAPS, DIES, &c., &c.,
HANDRAIL TUBINGS, IRON AND BRASS, PLAIN OR TWISTED,
TELEGRAPH TUBES OR POLES, &c., &c.

JOHN WRIGHT AND CO., ESSEX WORKS, BIRMINGHAM,

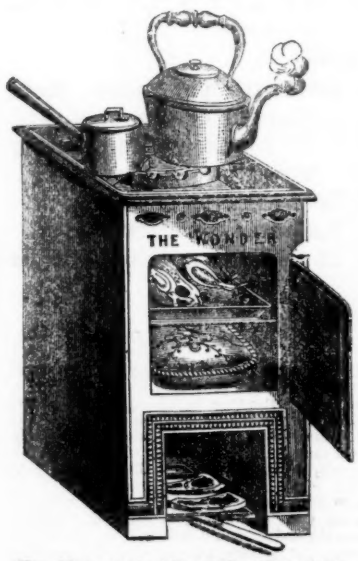
Beg to call the attention of MANAGERS and DIRECTORS of GAS COMPANIES to the following letter which they have lately received.

COPY OF LETTER RECEIVED FROM MAGNUS OHREN, Esq.

To Messrs. John Wright and Co., Essex Works, Birmingham. *Crystal Palace District Gas Company, Lower Sydenham, S.E.*

Dear Sirs,—In reply to your inquiries, I am glad to state that the use of GAS COOKING AND HEATING STOVES has been a complete success here. We have several hundred in use in our districts. We also find it advantageous to let out Stoves at a small rental. We have now 275 Stoves at rent.

The Stoves you make I can with confidence recommend, having so many in use, and giving satisfaction. I need scarcely point out to you the advantage to Gas Companies to recommend the use of Gas Stoves to their Gas Consumers, even where they do not supply them on sale or rent, as the use of Gas Stoves brings day consumption, and thus the Company make a profit by day as well as by night.—I am, dear sirs, yours faithfully, MAGNUS OHREN.



Size, 25½ in. high; 14 in. wide; 12½ in. back to front.

Price 50s., complete with Pan and Gridiron.

GAS HEATING STOVES

(TERRA COTTA AND IRON).

THE CHEERFUL STOVE.

COOKING STOVES.

BREAKFAST COOKERS.

BATHS HEATED by GAS

GAS STOVES

For Boiling, Broiling, Preserving, Heating Flat Irons, and for all other Domestic Purposes.

Gas Companies and the Trade who have not our Illustrated Catalogue are respectfully requested to apply for same.

A LIBERAL DISCOUNT to the TRADE.

No. 4003.

THE CHEERFUL GAS STOVE, with Copper Reflector,
Has all the appearance of a Bright Fire.
PRICE from 32s.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

J. T. B. PORTER AND CO.,

ENGINEERS AND CONTRACTORS,

LINCOLN, AND 1, WESTMINSTER CHAMBERS, LONDON, S.W.,

Beg respectfully to remind Gas Companies and Corporations that they continue to manufacture and supply every description of Apparatus connected with the

MANUFACTURE OF GAS AND ITS DISTRIBUTION.

GASHOLDERS, PURIFIERS, SCRUBBERS, CONDENSERS, RETORTS, &c., &c.

PLANS, SPECIFICATIONS, AND ESTIMATES FOR WORKS OF ANY SIZE.

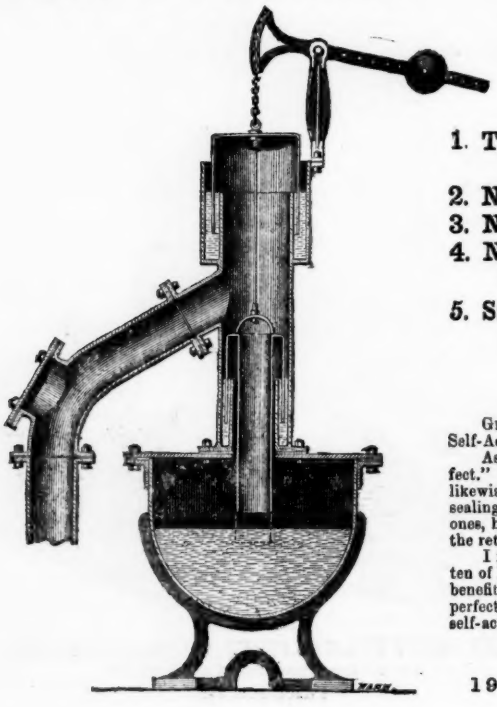
REFERENCES TO MORE THAN 500 WORKS ALREADY ERECTED.

PROSPECTUSES AND TESTIMONIALS ON APPLICATION.

SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

CHANDLER & STEVENSON.



ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

TESTIMONIAL.

Metropolitan District Asylum, Caterham, Surrey, Dec. 14, 1874.

MESSRS. CHANDLER AND STEVENSON.

GENTLEMEN,—I have much pleasure in bearing testimony to the complete working of your "Patent Self-Acting Dip-Pipes," which have now been in constant operation over three months.

As regards the action of the apparatus, I can describe it no better than by calling it "simply perfect." Immediately the retort is charged and the lid secured, the small holder rises, which lifts the Dip; likewise the instant the gas is permitted to escape at the mouthpiece the holder falls, thus perfectly sealing the Dip. I am fully convinced of the superiority of these Self-Acting Dips over Non Self-Acting ones, having experienced the fact that stokers do occasionally neglect to unseal the Dip after charging the retort, thereby causing a waste or loss.

I feel that it is quite unnecessary for me to say more on the subject, excepting that, having had ten of Messrs. Chandler's Dip-Pipes in use more than one year, and having experienced the great benefits derived thereby, inasmuch as the yield of gas from the coal is greatly increased, and the retorts perfectly free from carbon and other advantages, and seeing that the same Dip has been made perfectly self-acting by the second patent, I feel convinced that this is the right thing.—Yours obediently,

W. CRICKMAY, Resident Engineer.

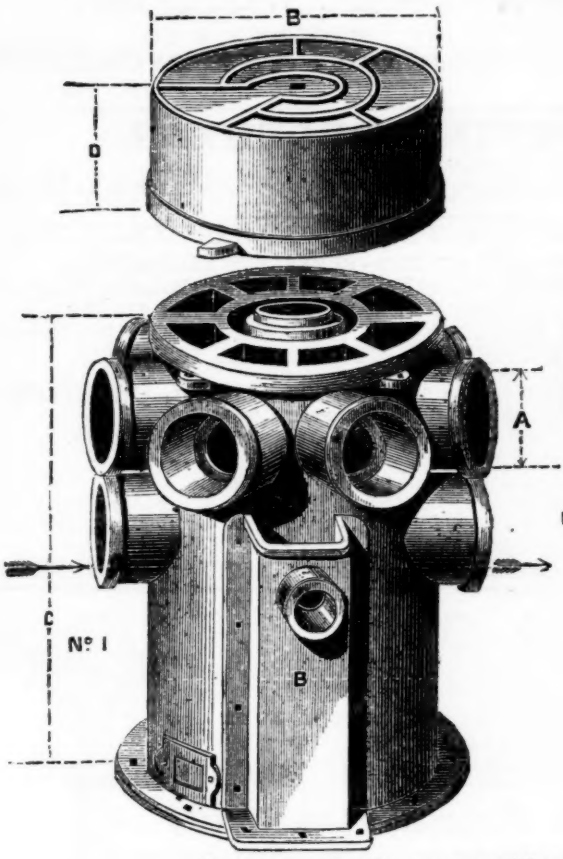
For terms of use and cost, apply to Mr. G. W. STEVENSON,

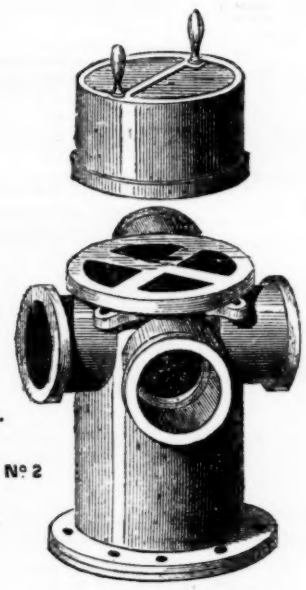
19, GREAT GEORGE STREET, WESTMINSTER.

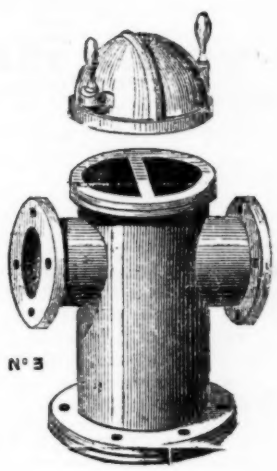
MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.







THORNCLIFFE
IMPROVED BYE-PASS VALVE.
SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE
IMPROVED STOP-VALVE.
SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

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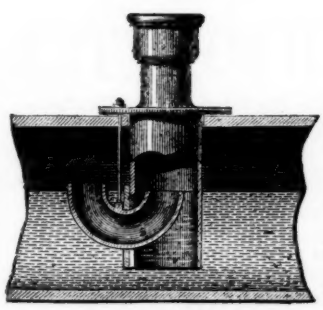
PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



DIP-PIPE, No. 1.

Messrs. N., C., and Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING HYDRAULIC DIP-PIPES.

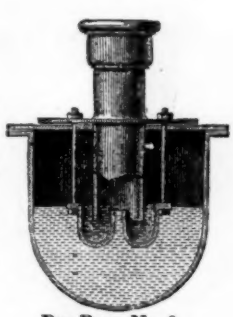
By their use the whole of the pressure caused by the Seal in the Hydraulic Main is entirely avoided, thus securing the many advantages long sought for.

Over 50 Gas Companies have already been supplied with them, many of which have been using them throughout their entire works continuously for over two years.

They can be applied to existing Hydraulic Dips, and at a very small cost.

They seal themselves in the same manner as the ordinary dip-pipes, therefore they are not likely to get out of repair.

By the aid of the adjusting screws they can be made to work on the old principle at pleasure.



DIP-PIPE, No. 2.

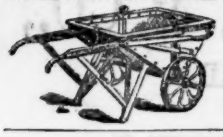
FOR PRICES, TESTIMONIALS, &c., APPLY TO

Messrs. NEWTON, CHAMBERS, & CO., Thorncliffe Iron-Works, near Sheffield, Sole Agents;

OR TO THE PATENTEE,

J. G. HAWKINS, NEEPSEND GAS-WORKS, SHEFFIELD.

PRICE'S PATENT COKE & COAL BARROW.



effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

FIRE-CLAY RETORTS.

WILLIAM FRASER,

INVERKEITHING,

Owner of the Works at which Fire-Clay Retorts were first made), can supply

RETORTS, FIRE-BRICKS, &c.,

to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his CELEBRATED HALBEATH STEAM COALS, on Navy List.

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(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

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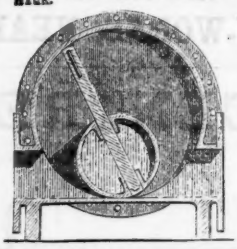
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING

GAS EXHAUSTERS

ARE NOW MANUFACTURED BY

B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.

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ENGINEERS & IRONFOUNDERS,

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KÖRTING BROTHERS,

SOLE LICENSEES FOR

W. CLELAND'S PATENT STEAM-JET GAS-EXHAUSTER.

E. KÖRTING'S PATENT STEAM-JET GAS-EXHAUSTER.

SMALL COST—COMPACTNESS—PERFECTLY SELF-ACTING—SELF-REGULATING—SELF-CLEANSING—SMALLEST BOILER PRESSURE SUFFICIENT—NO STEAM-ENGINE—NO GEARING—NO ATTENTION—NO EXTRA ROOM REQUIRED—NO TEAR AND WEAR—NO NOISE—NO OSCILLATION IN VACUUM, OR BACK PRESSURE.

UPWARDS of 100 in USE in CONTINENTAL GAS-WORKS.

IN ENGLAND, SUPPLIED TO—

The Gaslight and Coke (Chartered) Company's Works, London.
The Liverpool United Gaslight Company's Works, Linacre.
Cornholme District Gas-Works, near Todmorden.

These Gas-Exhausters are kept in stock in 16 different sizes, delivering from 500 cubic feet to 60,000 cubic feet of Gas per Hour, at

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HODGE & CO.'S

IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES

TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

GAS ENGINEERS,

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Drawings and Prices upon application.

PRIZE MEDALS—1862, 1867, 1871, 1874.

SYDNEY LEONI & CO.,

Sole Licensees and Agents for the United Kingdom of Great Britain for

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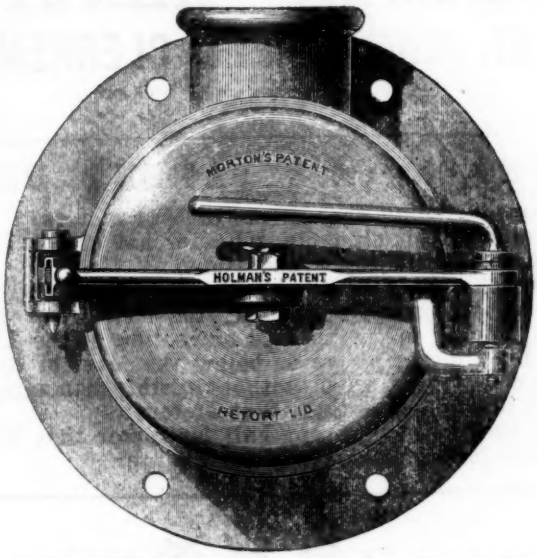

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„ Consumers Gas Co., Woolwich.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 23, 1875.

Circular to Gas Companies.

The anxiety of the Government to push forward the Regimental Exchanges Bill led to an early sitting of the House of Commons on Tuesday last, and a consequent alteration in the arrangement, made by Mr. Secretary Cross, for the reception of the deputation from the metropolitan gas companies at the Home Office. An interview did, however, take place at the House of Commons. It is a matter for observation, that the Chartered Company were not represented on the occasion, and that the South Metropolitan—the company, it might be supposed, least interested in opposing the schemes of the authorities—contributed several members to the deputation. The case for the gas companies was very ably stated by Mr. R. Baxter, and enlarged upon by Mr. St. George Burke. Of course no distinct expression of opinion, on the merits of the case, could have been expected from the Home Secretary, and the deputation were perfectly satisfied with his assurance that the matter should receive his "most careful "consideration." We are quite content with this promise, having no doubt whatever as to the decision the right honourable gentleman will arrive at, after a careful consideration.

The proceedings on the Regulations Bill are still in a state of suspense. The 6th of April has been fixed for the second reading, and before this takes place, we shall know nothing of the constitution of the committee, the selection of whom is a delicate matter. There are members of the House largely interested in gas undertakings, and there are some outspoken opponents of what we consider the legitimate rights of the companies, but the majority of the members, we fear, are utterly ignorant of gas matters. Thus the selection of five "competent and im-"partial" (to use a phrase now familiar to metropolitan gas legislation) committeemen becomes a difficult business. We have, as yet, no positive assurance that the Bill will get so far as before a committee; but, in the absence of information to the contrary, we must assume that it will be proceeded with.

According to our view, the position of the metropolitan gas companies is a purely defensive one, and for that reason we are inclined to deprecate the course taken by Colonel Makins, with reference to the parliamentary proceedings of the Metropolitan Board of Works. Whether they have, or have not, statutory power to initiate legislation with regard to gas matters, we do not care to inquire. It is a serious question for the ratepayers, whose money is squandered in these proceedings; and, as ratepayers, we have strong objections to the course taken by the Metropolitan Board. There are, however, parties whose business it is to see that all expenses are legitimately incurred, and we are content to leave the matter in their hands. The return to be asked for by Mr. Sandford will, if obtained, be of great interest, and will, we think, rather astonish metropolitan ratepayers, who are somewhat in the dark as to the cost of the abortive parliamentary proceedings of the Board, who have not been particularly successful either in promotion or opposition. With regard to Colonel Makins's question, we may, though too late, reassert our belief that the best policy for the companies is to remain in a purely defensive position. The gas companies, it may be urged, are among the largest ratepayers in the metropolis, and, as such, they may be right in considering that they should not feather the arrow intended to strike them down. But, just now, the consideration might well have been waived. The advance into the enemy's camp might have been deferred until his attack has been defeated. We have now only to stand in defence of rights, over and over again guaranteed, and in that position we must certainly triumph.

A Bill to amend the laws regulating the sale of coal, culm, cinders, and coke, was introduced to the House of Commons early in February, by Mr. Gourley and others. The original Bill has since been withdrawn, and a Sale of Coal, &c., Bill (No. 2) has been brought in. This second Bill has not yet been printed, and consequently we are not yet acquainted with its provisions. The original Bill was to enact that after a certain date, to be fixed by the Act, no coals, slack, culm, cannel, cinders, or coke, of any description, should be sold by any persons by way of retail other than by weight, such weight being marked legibly on the cart, sack, or bag containing the same, and in no less quantity than one stone, or 14 lbs.; and every person selling by way of retail other than by weight would be liable to a penalty not exceeding £5 for every such sale. We fail altogether to see the smallest necessity for an enactment of this kind, and as regards cinders and coke we see strong objections. We will put the strongest first. A multitude of the poorest class in London, and, no doubt, in the provinces also, are supplied from day to day with small quantities of coke, by a class of dealers not much richer than themselves. If any of the respectable gentlemen whose names are on the back of this Bill will take up a position at the entrance of courts we can name, when the coke cart comes round, they will see a crowd of women and children gather, and take away their small purchases of fuel in the skirts of their gowns, sometimes in their under-clothing, when they have any, and sometimes in the strangest domestic utensils. The dealer measures the coke in a rough way—the weight rarely being 14 lbs.—but there is this to be said, he measures *coke*. Now, we have a strong suspicion that if he *weighed* the article, he would weigh a good deal of water, and his poor customers would be greatly defrauded, for coke takes up water like a sponge. We must, therefore, request the amiable and innocent authors of this Bill to stay their hands, and place no temptation in the way of one class of very poor people, to rob another class still poorer. To some gas companies, whose trade in coke is mostly, or entirely, retail, the Bill, if passed, would give an infinite amount of trouble, without producing any corresponding advantage. It might furnish an inducement to stacking coke in bad weather, whereby the weight would be increased; but that would not benefit their customers, who now profit by the anxiety of the manager to get the coke off the premises. The large contractors would not be affected. They would still bargain with the companies for chaldrons of coke, and retail it as the law directed. We need not say more on this subject until No. 2 Bill is printed and before us.

The statement of accounts to be presented to the shareholders of the Crystal Palace District Gas Company at the half-yearly meeting on the 25th inst., shows a very healthy state of affairs. The directors are able to pay full statutory dividends, and to carry forward £1151 17s. 10d. At the present time this must be regarded as a very satisfactory result, and we may hope that in the next half year some additions will be made to the reserve and insurance funds, both now very low. A vacancy in the direction having occurred, Mr. G. T. Livesey, of the South Metropolitan, has been elected to the seat—a selection which is

certain to meet with the approval of the shareholders. The reports of the chemical adviser of the company (Dr. Letheby) and the examiners of the local authorities, show that the illuminating power of the gas is well maintained; and we hope we shall hear no more of disagreeable disputes about "sulphur."

The Corporation of Leeds are almost the only local authority unfortunate in the management of their gas undertaking. The companies were bought up for, we believe, the lowest price ever paid for going concerns of the kind and magnitude, and yet the Town Council have failed to make them pay during the past year. We have before remarked upon a deficit, but to-day we quote from the "Leeds Official Year-Book"—a publication of some authority, we presume—and there we find that the actual present deficit or loss on the undertaking is £26,575—that, at all events, is the sum which appears in the general balance-sheet, as taken from the borough fund. The actual loss on the past year appears to have been only £11,156, in consequence of the necessary payment of £9428 to the sinking-fund. The Corporation of Leeds may, however, take heart. They have only to manage their undertaking on strictly commercial principles, and having the services of a highly competent superintending engineer, they may easily pay the debt incurred, and, for the future, make both ends meet. That, as we contend, is all they should attempt to do.

An indignation meeting has been held by consumers at Birmingham, who protest that they are charged for a great deal more gas than they have burned; and who say that during the last quarter of 1874 "a mysterious and sudden expansion of the regis-"tering powers of the meters" of both the companies took place, the cause of which demands immediate investigation. We can only suggest to the complainants that they should get their meters tested, though this proceeding will never convince those who argue that, because they have the same number of lights, and burn them, as they think, the same number of hours, the consumption of gas must be uniform. All the Birmingham Gas Bills are now fairly under weigh in the House of Commons, and we have little doubt that further complaints will have to be made to the Corporation, who will point triumphantly to the meter indexes, and tell the consumers they must pay accordingly. The last half of 1874 was very profitable to the Birmingham Companies. The old company are able to pay full statutory dividends from profits, and carry forward £2864. The Birmingham and Staffordshire Company also pay full dividends, and have then a balance left amounting to no less than £18,244, a striking contrast to the result of the working in the previous half year. It is likely that these statements will stimulate the desire of the Corporation to get possession of the undertakings, and reassure those who were frightened by the balance-sheet of the Birmingham and Staffordshire Company for the first half of 1874.

The Longton Gas Company have agreed to sell their undertaking to the Corporation. The consideration is to be £20 for every £10 fully paid share entitled to 10 per cent., and £14 for every £10 ordinary share entitled to 7 per cent. The Corporation, of course, assume all the debts and liabilities of the company, and pay all expenses incidental to the transfer. It is quite certain, in this case the Corporation have made an exceptionally good bargain. The condition of the works, and the promising future of the undertaking, would have justified a higher price.

The Town Council of Glossop have been smitten with the desire to have a gas undertaking, and have proposed to make an offer to the gas company which, if made, we recommend them promptly to reject. The offer is 80 per cent. premium on shares entitled to 10 per cent., and 45 per cent. premium on the 7 per cent. shares. As the company have paid full dividends for several years, and in the troubled times we have recently passed through, it is clear that the undertaking is in a highly prosperous condition, and that its real value is considerably in excess of the offer made.

The Town Council of Cardiff have withdrawn the clause in their Improvement Bill, which would have given them power to purchase the gas undertaking, the price proposed to be paid being altogether inadequate.

Our readers will see that considerable progress has been made with the gas Bills before committees, and we are glad to say that the companies seeking for new powers have, on the whole, been very successful.

Some notion of the probable price of coal for some time to come may be gathered from the award just made by Mr. Rupert Kettle, in a dispute between the coalowners and miners of the Northumberland district. Without going into details, we may say that the award, although making a considerable reduction in the wages of all underground workers, still leaves those of hewers in hard-coal collieries 16 per cent. above what they were in 1871, and in soft-coal collieries 13½ per cent. above the rate in 1871, with a proportionate reduction in the wages of the other men employed underground. The price of coal in the coming contract season cannot be expected to be less than 25 per cent. in advance of the price of 1871.

Water and Sanitary Notes.

THERE are probably very few who do not feel that when Lord Elcho undertook to conduct the Municipality of London Bill in the House of Commons, he assumed a task utterly beyond his powers. If any such Bill be passed—and one must, and will eventually—it must be in the hands of a statesman. Where John Stuart Mill failed, Lord Elcho could hardly hope to succeed, even with a measure which we prefer to that fathered by Mr. Mill. We gather from a most able speech of Mr. Newton, at the last meeting of the Metropolitan Board, that he is not perfectly satisfied with the present arrangements for the local government of London, but his desire is to obtain extended powers for the Board, of which he is, perhaps, the most efficient member. That, however, cannot be.

If we are not to have a "municipality of London," we must have a differently constituted Board of Works. But, after all, there is not so much difference of opinion between the promoters of Lord Elcho's Bill and the Metropolitan Board. "We have," says Mr. Newton, "acknowledged that change may be desirable "in some part of the government of the metropolis, and have "expressed an opinion that if a change be made, it would be well "to combine the two principle governing bodies into one." But surely Mr. Newton would not acquiesce in the enormous disproportion in representation which would be involved in the combination of the Common Council of the City of London with the Metropolitan Board. The two bodies, in the event of union, would have to be reconstituted, and on their combination on equal terms we should have the first step made towards one municipality, to which Mr. Newton is evidently inclined.

A Cabinet Minister, backed by a powerful majority kept well in hand, can afford to say to the House of Commons that the Government is determined to pass a certain measure, and this Mr. Secretary Cross has said with reference to the Artizans Dwellings Bill, or whatever name it may eventually be known by. We do not at all regret the determination of the Government, for the measure, which can do no harm, is likely to be productive of much good. The "rookeries" which may be cleared away under its provisions are the disgrace of the day, and no reform in the habits of those who dwell in them is possible so long as they exist.

The accounts of the Birmingham Water-Works Company, for the past half year, show a highly prosperous state of affairs. The profits of the half year reach the sum of £25,299, and the total profit in 1874 exceeds that made in 1873 by £11,864. Under these circumstances, the company are able to declare maximum dividends on all classes of shares, and then there is left a balance, which is to be appropriated to making up the dividend, in the first half of 1865, from 6½ per cent. to 8 per cent.—a very good bonus for the holders of A and B shares.

The Leicester Water-Works Company have succeeded with their Bill before the Commons committee, but we have no doubt that the opposition will be carried to the Lords, with what result it is impossible to foresee. The Corporation seem determined to get the half profits on the new shares, or to get possession of the undertaking, which they see to be increasingly profitable.

The Corporation of Oxford have succeeded with their Water-Works Bill before a committee of the House of Commons, in the face of opposition by the Conservators of the Thames. The Bill is to give the Corporation power to take an unlimited quantity of water, which must come directly or indirectly from the Thames, and the Commissioners wished to place a restriction on the quantity. We do not suppose that the Conservators will renew the opposition in the House of Lords, but we can well understand that they view with some anxiety the continually increasing demands made on the river.

FOUL CISTERNS IN THE CITY.—Dr. Sedgwick Saunders, the medical officer of health for the City, in a recent report to the Commissioners of Sewers, states that the scanty supply of water and the very defective condition of the receptacles used for its storeage in some of the most unhealthy and crowded places in the City, the constant presence there of preventible and other diseases, and the approach of warmer weather, which must inevitably aggravate these evils, make him contemplate with dismay any further procrastination in the erection of the 65 hydrants or stand-pipes ordered by the court in November last, and intended to supply in all 536 houses. Diarrhœa, fever, and kindred diseases, were rarely absent from those courts in which the water supply was either deficient, or where the receptacles which contained it were so placed as to invite direct contamination of the only supply accessible to the people. For instance, four cases of fever, which had recently occurred in one house in Fireball Court, were directly traced to a foul cistern, the water in which had become polluted by the poisonous gases given off by the sewer beneath, with which the waste-pipe had immediate communication. He submitted a list of nearly 200 houses in his district in which the water supply was defective, and the receptacles in a filthy condition. He suggested that the landlords should be forthwith called upon to demolish the water-butts now in use, and erect in their stead proper cisterns, or that the stand-pipes should be substituted before the hot weather set in. The quality of the water supplied by stand-pipes was not only of a high standard of purity, but of a tolerably constant character chemically.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

LVI.

GASHOLDERS.

The choice of the site for a gas-work must necessarily be controlled by a variety of circumstances—such as the price of land, the facilities of obtaining building and other materials, but more especially by the facility of obtaining coal, both as regards its price and permanent supply. The site should also be in close proximity to the district to be lighted, for the twofold purpose of avoiding useless expenditure in the distributory apparatus, and affording facilities for the transport and disposal of the residual products. And yet the position chosen should be sufficiently distant from a populous neighbourhood, to avoid the complaints, just or unjust, that might be raised on sanitary grounds.

Amongst other important considerations in the selection of the site, is the nature of the soil, and its suitability for the necessary buildings; whether expenses are likely to be incurred, either in raising, or excavating to lower, its level, or whether walls to protect it from inundations may be considered necessary, &c.

There are various other contingencies which must govern the determination; but the choice once made, it then becomes the duty of the engineer to decide on the best, and at the same time the most economical, means of constructing the various buildings and apparatus constituting the works. Of these, so far as regards the nature of the soil, unquestionably the most important are the gasholder-tanks.

The first step to be adopted (if not already done) is to ascertain the nature of the soil. For this purpose, in ordinary ground, three or more pits or dry wells may be sunk in the locality, to the depth of the foundations of the proposed tanks, due care being observed that, when constructed of bricks, masonry, or concrete, the tank shall project a short distance above the ordinary level of the ground, for the sake of preventing, in a great measure, any substance accidentally falling therein. These pits being dug, furnish sections of the ground where the buildings are to be constructed, and thus a fair idea of the work to be executed can be obtained.

Beyond all question, the best soil for the class of construction under consideration is the plastic clay, as found in abundance in London. A remarkable example of the excellence of clayey soil, for constructing gasholder-tanks upon, exists at the Pancras station of the Imperial Gas Company, where the tanks are erected on the London clay. The engineer, cognizant of the substratum, when specifying the construction of a brick tank of 145 feet in diameter and 55 feet deep, stipulated, in the first instance, that the clay in the centre should be left as a cone, relying upon the capacity of that material for retaining. In the progress of the excavation, it was ascertained that, at about 35 feet from the surface of the ground, the clay became somewhat loamy, and it was considered necessary to lay three or four courses of brickwork over the lower portion of the cone to the height of about 22 feet, but the rest was left as excavated. The tank, as thus constructed, was, in every sense of the term, perfect, and when it is considered that a pressure of upwards of 15 lbs. on the square inch was exerted on the clay, without any loss of water by leakage, the extraordinary impermeability of clay is clearly established. After this may be enumerated compact earths of all denominations—shale, marl, loam, &c.—which permit of the sides of the excavation of tanks of small diameter remaining firm and secure without the aid of shoring; but, as excavations increase in diameter, so do they approach nearer to the state of a straight line or wall, and thus lose the retaining form of the arch which exists in those of limited dimensions. Then follow gravel and sand, which require much greater angles of repose than any of the preceding soils—or, in other language, the slope of the excavation of such soils is required to be greatly increased, in order to prevent it from slipping or falling after the excavation is made. It may be incidentally observed that, among other great improvements introduced in gas engineering of late years, the construction of concrete tanks is one of the most important, and this system has been very successfully adopted in some extensive works. Where gravel is met with in the excavation for tanks, it may be rendered a valuable portion of the building material. When sand is encountered, then, on account of its angle of repose, the quantity excavated in the construction of a tank of a given capacity must be very considerable; but, on the other hand, the reduction in the price per yard compensates for the large quantity required to be removed.

In some places the site may be of "made ground," expressed more comprehensively in French as "*terrain transporte*" (transported ground)—that is, ground transported from another locality. This is always very treacherous, and no building should be erected therein, unless the foundations are carried down to the firm virgin soil beneath. An instance may here be recorded of the want of care displayed in the study of the soil, which occurred about 32 years ago, in the construction of a gasholder-tank for supplying a large town in Germany. The engineer, bearing a name very honourably associated with gas lighting, erected a cast-iron tank on the description of ground in question; but after a few days operation, the whole of the structure, tank, and holder, suddenly gave way, and presented a complete wreck. The holder, according to our informant, who was an eye witness after the calamity, assumed the shape of "an old cocked hat," and the town was put in darkness. Making due allowance for some exaggeration in the description, it can be understood that a collapsed holder is by no means an interesting sight.

Or the locality chosen may consist of marsh—perhaps the worst of all possible positions for the purpose. In this case means must be adopted to ascertain the depth of the substratum of solid ground. This is accomplished by probing the earth in a vertical direction, with an iron bar of about three-quarters of an inch in diameter, which, with the strength of a man, will sink several feet, until reaching a solid bottom. This attained, a judgment may be formed, according to its depth and other circumstances, whether an iron or brick tank will be the most suitable. Should the solid ground be more than 5 or 6 feet from the surface, it will then be necessary to pile the whole of the area of the location for the tank. The strength of the piles will depend upon the depth of the stratum; for ordinary purposes, those of 6 inches sectional area, placed at intervals of a square yard, and driven by a 20-foot pile engine, will be sufficient. But when the solid cannot be reached by piling, it is futile to attempt to construct a tank in such a position, for it is better to sustain a positive loss by renouncing the site, rather than expend money on a construction that must of necessity fail. Again, in some localities, chalk or other rock of various kinds is encountered. For the former, little skill is requisite, as the excavation can be performed by ordinary labourers; but for hard rock, where blasting becomes necessary, for which a special class of workmen are requisite, the cost becomes a serious consideration, as compared with the construction of a cast-iron tank. The writer once met with a site of this description, and having good miners at hand, the excavation was made to the desired depth, its diameter being about 18 or 20 inches greater than the tank when completed. The wall, except the parts occupied by the piers for the holding-down bolts, was built of square stones, similar to paving-stones, of about 7 inches thick, the space between this and the rock being made good with rubble and hydraulic mortar. When completed, the tank was as tight as could possibly be desired. It is almost needless to say, the object in constructing tanks of great thickness in loose ground is to prevent them yielding or bursting; but that when in rock, the slightest wall, if properly built, is sufficient.

Lastly, there are sites where water exists on the very surface, as in low ground in the proximity of rivers, or it may be ground to be reclaimed from the sea; or, in sinking the trial pits, water may be found at a few feet from the surface; all of these conditions require different methods of operation, which will have our attention.

There is an old adage that "water is an excellent servant, but a very bad master," and in few instances is this more appropriately illustrated than in the construction of gasholder-tanks, in localities where water presents itself in abundance. The engineer should endeavour, therefore, to retain this element in the first-named capacity, for when water obtains the mastery, the limit to the expenses, in many cases, is beyond conception. The writer remembers an instance in which the contractor for the construction of two large tanks sustained a serious loss by obstinately persisting in carrying out the plans, by removing the water by pumping, and this by manual labour; for 30 years ago steam power was little used for such purposes. After several weeks of ineffectual operations, working day and night, the futility of the course pursued being evident, it was decided to build the tanks somewhat higher than originally intended. The foundations of hydraulic concrete were then formed in the water, the work was proceeded with, and no further difficulty was experienced. But all this loss and inconvenience would have been avoided by first sinking a pit to the desired depth, when the presence of water and a sandy soil having been ascertained, the tank would have been designed accordingly, and the steps ultimately necessitated would have been adopted in the first instance. In localities, therefore, where, in the trial excavations, water is shown to exist, the utmost caution must be observed in conducting the works.

Under all these varied conditions the judgment of the engineer is called into requisition, to decide on the best means of carrying out the work, so that it may be perfectly executed, and at moderate cost, for any useless expenditure must result in a proportionate and permanent reduction of dividends to the shareholders. On the other hand, cheapness alone should never be a consideration; there should always be a proper exercise of judgment and skill, in order to determine the mode of construction. Whether the tank or tanks should be of brick, masonry, concrete, or iron, or a combination of two or more of these, are questions dependent on numerous circumstances, such as the nature of the site, the cost of suitable building material, and the class of skilled labour in the locality, the price of iron, expenses of transport, and customs duties, where such exist.

In England, where the best advice can be obtained at a day's notice, where building materials of all kinds are ready at hand, where the best of workmen can be procured, and, if desired, contractors to execute the work, the engineer need not incur much responsibility; but the case is widely different with many of our countrymen who fulfil the offices of managers of gas-works in towns in remote parts of the world, and who, in their isolated positions, are thrown entirely on their own resources, and are often required to carry out the execution of works with labour and material of a very inferior description, and under numerous other disadvantages. To this class especially we hope that some of our observations on gasholder-tanks may be acceptable.

Having briefly referred to the different kinds of site to be met with, we now proceed to a description of the various methods of constructing holder-tanks.

(To be continued.)

REDUCTIONS IN THE PRICE OF GAS.—The Rochdale Corporation will reduce the price of gas on the 1st inst., from 4s. 8d. to 4s. 3d., and from 4s. 2d. to 3s. 11d. At Bristol the price, from July next, will be reduced 6d.; and at Helensburgh, from the 1st of May, 10d. per 1000 cubic feet.

Communicated Article.

THE LIGHTING, WARMING, VENTILATION, AND WATER SUPPLY OF THE NEW OPERA HOUSE AT PARIS.

(FROM OUR PARIS CORRESPONDENT.)

The new Opera House at Paris, which was commenced in July, 1861, and inaugurated in January last, is undoubtedly worthy of being classed among the most remarkable monuments of our age. It is not our intention to give our readers anything like a detailed description of this vast and imposing edifice, within which may be found all the wonders of art and industry of the present day. Our task must be confined to a consideration of the various arrangements made for the distribution of light, heat, and water in the different parts of the building; and in the course of our labours we hope to show how much careful study the eminent architect, M. Garnier, has devoted to all these matters, the proper regulation of which is of primary importance in a theatre.

Before entering into the details of the subjects more immediately connected with the present articles, we will cite a few figures, to give our readers an idea of the dimensions of the magnificent building whose interior arrangements we are about to study, and whose beautiful *façade* now forms so attractive a feature on the Boulevard des Italiens.

The new Opera House stands upon an area of 11,237 square mètres, or 13,440 square yards (about $2\frac{3}{4}$ acres), and measures in bulk no less than 428,666 cubic mètres, or 15,132,000 cubic feet. Its greatest length is 173 mètres, or 568 feet; its width, 125 mètres, or 410 feet; its height above the level of the street, 56 mètres, or 184 feet; depth under the stage, 10 mètres, or 33 feet. The total height of the building from the foundation to the top of the group of figures, with Apollo in the centre, surmounting the roof, is 82 mètres, or 269 feet.

In the erection of the building there have been employed 76,998 cubic mètres, or 2,718,030 cubic feet, of stone; coarse plaster, 5255 cubic mètres, or 185,502 cubic feet; fine plaster, 465,900 bags. The time occupied in the masonry amounted altogether to 673,295 working days. For the building alone there were used of wrought and cast iron 6,675,530 kilogrammes, or about 6557 tons. For the stage machinery—of cast iron, 253,600 kilogrammes, or about 249 tons; wrought iron, 638,160 kilogrammes, or about 627 tons; lead, 80,000 kilogrammes, or about 79 tons, were employed. Of hempen rope, 223,100 mètres, or 243,825 yards, were used; of wire rope, 12,700 mètres, or 13,880 yards; this latter being composed of no less than 7,563,000 mètres, or 8,265,574 yards of iron wire—very nearly 4700 miles. The number of places in the theatre is 2516. The passages, staircases, &c., for the ingress and egress of visitors, as well as those for the use of the persons engaged upon the establishment, are very numerous, and easy of access, there being no less than 6319 stairs and 1494 ladder steps in the building. The number of doors is 2531, and of keys 7593.

Leaving the foregoing figures to the consideration of our readers, we will now turn our attention to the first of the subjects enumerated at the head of this article.

I.—LIGHTING.

The introduction of gas lighting in France is intimately associated with the history of the Academy of Music. During the first 150 years of the existence of the Opera, the only means of illumination known were successively the candle, wax, oil lamps, and the lamps known by the name of Locatelli.

In the month of June, 1818, M. de la Ferté, the director of the *Menus Plaisirs*, was sent on a mission to London for the purpose of obtaining information as to the application of coal gas to the lighting of theatres. This gentleman having reported favourably upon the new method of illumination, it was decided, on the 29th of December, 1818, that an account should be opened for 150,000 francs, upon the security of the fund specially appropriated to defray the expenses of theatres; and this sum was to be employed in the establishment of the first royal gas-works. The profits, whatever they might be, to be derived from this enterprise, were to go to make up any deficiency in the resources of the Royal Academy of Music. It was at that time that the gasometer in the Rue Richer was constructed. Not quite four years later, however, in June, 1822, a royal decree was issued, to the effect that, considering that the gas-works had attained the end for which they had been established, and that there remained no longer any doubt as to the success of the undertaking, they should be handed over to certain qualified persons, who were thenceforth to carry them on.

Since that time, the use of gas for illuminating purposes has become general; and, as far as its employment in theatres is concerned, it is a well-known fact that gaslight may now be found in use in the least important of them, in all parts of the house. One exception to the otherwise general rule may, however, be cited, and that is at the Théâtre Français, where the members of the company have decided on continuing the use of oil for the footlights, the light thereby produced appearing to them to be less liable than gaslight to fatigue the eyes.

In the new Grand Opera House the consumption of gas will, of course, be considerable; it has been estimated at about 600,000 cubic mètres, or close upon $21\frac{1}{4}$ million cubic feet, per year of 182 ordinary representations.

The arrangements outside the building, for lighting the approaches to the Opera and the public thoroughfares in the vicinity, consist of branch pipes connected with the main of the Paris Gas Company. For the interior lighting, a 10-inch main for the exclusive supply of the Opera, has been laid round the building. This pipe is a branch of the 27-inch main coming from the Paris Gas Company's station at Ternes, and running along the Boulevard Haussmann, and it is connected with ten meters by means of 6-inch pipes. Six of these meters are capable of supplying 1000 lights, and the other four 800 lights, giving a total of 9200 lights.

By an ancient *ordonnance*, lighting by means of oil was ordered to be maintained in certain parts of theatres, so as to be available in the event of any accident causing the gas to be suddenly extinguished. At the theatre in the Rue Lepelletier the corridors used to be lighted with oil-lamps, which were not unfrequently productive of very disagreeable odours. At the new Opera House, however, it has been thought preferable to fix an endless pipe for receiving the gas supplied by the ten meters simultaneously; and consequently, to effect a sudden extinction of the gas, all these meters, which are connected with the entire network of mains in Paris, would have to fail at the same time—an event which is practically impossible. The gas is distributed to each storey in the theatre by means of double supply-pipes; a single one would, however, suffice to maintain a supply to the services, in case of accident.

The lighting of the theatre may be divided into—lighting during the performances, when, of course, the full supply is given, all the burners being in use; the permanent lighting, which goes on day and night in those parts of the building where daylight is not obtainable; and the lights which are required to be kept burning for the use of the firemen and watchmen when going their rounds.

The total length of gas-piping of various kinds (iron, lead, and copper) employed in the building is 25 kilomètres, or about 27,350 yards, and to this vast extent of piping there are affixed no less than 714 taps of different kinds.

In carrying out the lighting arrangements in the new Opera House, the contractors have brought into successful operation several very ingenious improvements in this important section of their undertaking, and every precaution has been taken by them to prevent escapes of gas, and consequently obviate the risk of accidents from explosions. They have introduced a new kind of tap, working with a slide, by the aid of which the shutting off of the gas may be effected when the tap is lubricated.

The lighting of the stage is regulated by means of a very ingeniously contrived apparatus, to which, owing to the multiplicity of the pipes it contains, the name of the miniature organ has been not inappropriately given. In order to meet all the requirements of the scenic arrangements, and to produce as perfectly as possible every kind of theatrical illusion, the lighting of the stage should be susceptible of infinite variety. Not very long ago, whenever a modification in the lighting of a scene was required, the gasmen had to be stationed on either side of the stage, where, in suitable positions, a number of taps were placed, by the manipulation of which the desired effects were produced. Now, however, all these multifarious operations are centralized, and by the aid of the new apparatus to which we have referred, which in the new Opera House is placed under the fore part of the stage, and manipulated by a graduated wheel, an instantaneous or progressive day or night effect may easily be produced either all over the stage, or in any particular part that may be determined. By the side of the prompter's box a niche is provided for the superintendent of lighting, who from this point issues orders to his subordinates, and supervises the carrying out of his instructions.

Amongst the difficulties attending these operations, there are two special inconveniences which it has been deemed necessary to provide against. In the case where a certain number of burners are required to be shut off, it is necessary to prevent the excess of gas, flowing back into the pipes, from throwing an undue pressure upon the burners remaining alight, and causing the flames to rise above the glasses. In such an event considerable inconvenience would result, both from the alteration in the amount of light that would be produced, and from the danger of the enlarged flame communicating with some of the stage decorations. This has been obviated by the use of pressure regulators. The other difficulty was this: Whenever the scenic requirements necessitated the rapid production of a night effect, there was always the danger lest by too abrupt a movement on the part of the person manipulating the gas, the lights should be completely extinguished; in which case it would be impossible to relight them, without interrupting the performance, until the conclusion of the act. This danger has been obviated by so arranging the pressure of gas on two of the supply-pipes that it never falls below a certain minimum previously determined upon, and sufficient for keeping all the burners supplied with enough gas to produce a small blue flame. In this manner total extinction of the lights is prevented, and the supply-pipes under the influence of the regulator only give the excess of gas necessary for keeping all the burners in full play.

The sunlight and similar effects upon the scenery are obtained by means of portable rows of gas-jets (*herses*), each having some eighty burners, enclosed in a close metallic network, counterpoised by weights, and placed in communication with the service-pipes by means of two india-rubber tubes. These rows of gas-jets, eleven in number, are raised or lowered at will by metallic cables working round windlasses.

It now remains for us to describe the row of footlights in front of the stage; these have been constructed in quite a special manner. Some years ago, after the occurrence of several accidents, means had to be devised for preventing the flames of the gas-burners in the footlights from setting fire to the performers dresses, in the event of their too close proximity. A row of lights was accordingly tried at a lower level than that of the stage, the light being thrown upwards by the aid of a large reflector. This method of lighting did not, however, possess the same advantages as direct illumination, the reflected light being of less intensity. A very ingenious system of lighting

was then discovered, which was in operation, with very satisfactory results, at the time of the destruction of the old theatre by fire. This system consisted of a row of footlights with the flames of the burners reversed; that is to say, with the burners placed above the glasses, these being traversed from top to bottom by the flame, which attracted to the lower part an artificial draught.

The following is a description of the method of arranging the footlights according to this plan, the entire row being divided into two sections. Two horizontal pipes are placed one above the other, and supported upon a square iron frame attached to a vertical iron rack. This rack communicates motion to the whole of the pipes, and consequently serves to raise or lower them as may be required. To do this, the rack is set in motion by the pinion of a small iron windlass composed of two shafts, one carrying a crank and an endless screw, the other provided with a worm-wheel actuated by the screw and pinion of the rack. The two windlasses of the two half-rows of lights are connected by means of an endless chain, so that, their movements being identical, the raising or lowering of the lights is always uniform. The lower horizontal tube is the one by which the gas is supplied, and it is connected with a small service-pipe at its two extremities by means of two knee-pieces; it also supports a series of small tubes arched round the upper tube, and these are bent back and terminate in a reversed burner. The upper horizontal pipe, which is of larger diameter than the lower one (7 inches), is provided in front of the burners with copper ferrules, in which the glasses are fitted. This pipe bends back at the two extremities of the line of footlights, and descends vertically into two bells with hydraulic plunger, and to the bottoms of these reach the pipes of the draught chimneys, which may be of either sheet iron or brick. These hydraulic junctions, like the knee-pieces, allow of the raising or lowering of the footlights without breaking the communications of air and gas.

Before the lighting of the gas takes place, two or three circles, formed of three small interior burners, and placed at a distance of about 13 feet one above the other, may be lighted in the draught chimneys, in order to determine and accelerate a current of air. The great heat generated by combustion at the points of junction of the glasses with their collecting-pipe, while the burners are in action, being liable to cause breakages, the idea has been conceived of surrounding this pipe with one of larger diameter, the intermediate space being filled with fresh air. In this way two very desirable results are obtained, for not only are the feet of the glasses kept cool, but the large pipe may be utilized for the ventilation of portions of the stage and theatre.

By the adoption of this mode of lighting, the generation of heat above the footlights is avoided, the rough glass which covers them being kept sufficiently cool to allow of the hand being placed upon it. The light produced is as brilliant as that obtained by the old method of illumination, and a very considerable economy in the consumption of gas is effected. Further than this, it allows the performers to approach close to the footlights in perfect safety; and, in the case of those theatres were *ballets* and pieces of a similar character are produced, the *artistes* appearing in which are usually attired in dresses composed of extremely light and gauzy materials, easily ignited, this special feature of the new system of lighting cannot fail to enhance its value.

Before leaving this part of the new Opera House, we have to speak of two other methods of lighting employed in addition to gas—namely, the *electric light* and the *Drummond light*.

The first application of the electric light at the new Opera House was for the purpose of producing the effect of the rising sun in one of the scenes in the opera of "Le Prophète." This light is adapted to the production of a great variety of stage effects; its rays are exceptionally brilliant, and it is a valuable auxiliary to the scenic artist in the reproduction of physical phenomena or the realization of scenes of fairyland. It colours and makes luminous the water of a fountain; it projects upon the soil or upon the walls of a church the reflections of windows through which the sun is shining; it may be made to reproduce flashes of lightning; its beams traverse a prism, and upon a piece of painted canvas appears a real rainbow.

The laboratory devoted to the preparation of the electric piles has been fitted up in an apartment on the ground-floor of the new Opera House, thereby obviating the inconvenience attending the transport of the acids into the upper floors of the building. This apartment has a superficial area of about 540 feet, and is furnished with six long oak tables, each covered with a thick sheet of glass, which preserves them from the corrosive action of the acids, and places the pile in conditions of complete insulation. Upon these sheets of glass are ranged the elements of the electric piles, on Bunsen's system, on a large scale. The number of these elements in the old Opera House was 60, but in the present one it has been raised to 70, owing to the increase in the amount of surface to be illuminated, and to the resistance offered by the great length of the wires.

The distance the electric current will have to travel from the apartment in which the piles are placed to the extremity of the stage is 400 feet and the total length of the wires for the supply of the electric light is nearly 4000 feet. In order that the operations connected with this branch of the lighting arrangements may be conducted with safety and facility, the laboratory has been furnished with a number of earthenware vessels, made expressly for the purpose, by means of which the distribution of the water and acids is effected. A large vessel, capable of holding about 220 gallons of liquid, allows of the preparation at one operation of sufficient acidulated water for the whole of the batteries; and by a combination of supplementary vessels, the nitric acid may be kept in the vases, and the vapours liberated from the warm acid at the moment the transference of the liquid to the vases takes place, necessitated by taking the pile to pieces, may consequently be to a considerable extent avoided.

Each generator is connected with the stage by means of fastenings attached to the walls of the building, and a galvanometer placed upon the wire of each battery indicates simultaneously the strength of the piles and which of them are in action. With the aid of a distributor, connexion is established between a particular battery and any point upon the stage where the light may be required, or several batteries may be concentrated upon the same point, to heighten the intensity of the light.

On leaving the pile, the electric current is transmitted to the apparatus employed for throwing the light upon the stage. This is composed of a lamp with an automatic regulator placed in a wooden lantern provided with a lens and a silvered glass reflector, and it is so arranged as to be easily placed at any required inclination, in order that the light may be made to follow any particular figure or group of figures, or produce any special illuminating effect.

For the production of the Drummond light, which is not so powerful as the light just described, a special double combination of illuminating gas and oxygen has been arranged. The apparatus is composed of a sheet-iron lantern having a lens in front, and furnished with a blow-pipe lamp, in which the two gases are kept apart until they arrive at the orifice of the burner, all contact between them in the interior of the lamp being rendered impossible. There are twelve of these apparatus, and they are supplied with oxygen from a gasholder of 71 cubic feet capacity, placed in a laboratory.

A bridge has been constructed under the arched roof from either side of the building, and extending the entire length of the stage, for the service of the electric light. An apparatus is placed on each flat, and upon and beneath the stage, to enable the attendants to make connexions at any given point.

Such is a brief sketch of the installation of this service at the new Opera House, and it will, we think, be admitted that it adapts itself to all the requirements of the stage. No other illuminating agent is susceptible of so great a diversity of applications as electricity, from those requiring the employment of the numerous elements on which we have been treating, down to the portable pile which, concealed in the head-dress of an actress, will cause a bright star to sparkle upon her forehead.

The lighting arrangements in use in this magnificent edifice may be classified under four heads—namely, the exterior lighting, the lighting of the theatre and its dependencies, the stage lighting, and the lighting of the apartments occupied by the management.

In the present article we have devoted our attention principally to a study of the arrangements made for the lighting of the stage, the most complex part of our subject; in the next we shall endeavour to lay before our readers some details as to the manner in which the light has been distributed in the various parts of the theatre and its dependencies.

(To be continued.)

Correspondence.

STEAM-JET EXHAUSTERS.

Sir,—Referring to Mr. W. Cleland's letter on steam-jet exhausters, published in your JOURNAL of the 16th ult., and Mr. Young's reply thereto in the number for March 2, we beg to hand you enclosed translated testimonial from Mr. Schiele, gas manager, at Frankfort-on-the-Maine.

Our reason for writing you is, that Mr. Young says in his letter, "I should be much afraid that it would materially reduce the illuminating power of a rich cannel gas." Mr. Cleland, in his article, had previously removed any ground for such fear, by stating that he found the "steam gas" decidedly superior. The enclosed testimonial from Mr. Schiele, of Frankfort, also speaks very favourably of our exhauster in this respect.

Though Mr. Young doubts the novelty of steam-jet exhausters in general, we think none will deny the novelty of our arrangement of the exhauster, with a view to dealing with varying quantities of gas, whether illuminating or otherwise.

The quantity of steam used with our jet exhauster is very small—two quarts of water to be evaporated per 1000 cubic feet of gas delivered per hour—in fact, so little, that its effect is entirely different from that of the jet exhauster of older constructions without the regulating slide. And the quantity of steam used being so very small, Mr. Young's fears as to the weakening of the illuminating power of the gas will vanish on hearing these statements.

As there may be a great many gas engineers of the same opinion as Mr. Young, we should feel very much obliged by your inserting this in your next number. DONAT RUBEN (for Körting Brothers.)

Manchester, March 15, 1875.

TRANSLATION.

Gas-Works, Frankfort-on-the-Maine, Aug. 28, 1874.

We have completed our trials of your steam-jet gas exhauster lent to us by Mr. Grahn, gas engineer, of Essen.

These trials have turned out to our entire satisfaction, and we are convinced that our heavy gas will not be reduced in quality as we feared.

The gas, whether we used your exhauster or not, gave the same illuminating power, which is equivalent to an increase, as the quantity of gas made from the same amount of material is rather more with your apparatus than with the ordinary exhauster.

We now intend fixing three of your No. 10 steam-jet gas exhausters. These three together will deliver twice as much as our greatest estimated production, while one will be sufficient for the smaller requirements of the summer months.

(Signed) SIMON SCHIELE, Director.

Messrs. Körting Bros., Hanover.

Sir,—My experience of the uses of steam-jet exhausters has been mainly confined to the exhausting of illuminating and heating gases; to the application of the resulting finely divided water to the absorption of ammonia, and to the causing the deposition of suspended condensable

matters, purposes which I consider to be identical with those claimed as novel by Mr. Cleland, and the conditions surrounding which are certainly, in all respects, similar.

I thought I had stated this sufficiently plain in my former letter, and therefore I do not see why Mr. Cleland should have desired you to reply, by alluding to the uses of jets of steam to purposes, the conditions surrounding which are entirely different, unless it be to draw away attention from the subject at issue.

If Mr. Cleland did not know that steam-jet exhausters had been used for purposes identical with those to which he laid claim, he might have said so; and if he did, he might, at least, have shown wherein the conditions surrounding the uses of the steam and steam-jet exhauster, to which I referred, differed from that which he puts forward as novel.

Clippens Shale Oil-Works by Paisley, March 15, 1875. WM. YOUNG.

BRICK OVENS *v.* BRICK RETORTS.

SIR,—Your correspondent, Mr. Dempster, has favoured you with an opinion as to the original inventor of "brick retorts;" but I think he cannot have read carefully Mr. A. Gibb's inquiry on that matter, or he would have seen that the question at issue was as to the original inventor of the settings known as "Clift's Ovens," this being the special setting referred to. I may state that Mr. W. Parsons, sen., was a practical brick-oven builder under the late Thomas Spinney, gas engineer, of Cheltenham, and had erected his ovens near upon 40 years ago. But "Spinney's Ovens," or "other brick retorts," are not to the point. Grafton is certainly entitled to be considered the first inventor of "brick ovens and retorts." Without entering on the merits of "brick retorts" over others of a similar material, I can assure Mr. Dempster that I am in a position to bring proof of my former statement.

Gas-Works, Whitchurch, March 19, 1875. CHARLES HASSALL.

PUBLIC HEALTH BILL.

SIR,—In your JOURNAL of last week, under the "Circular to Gas Companies," you call attention to the provisions of this bill, and say: "The bill contains one or two provisions respecting gas supply, against which we have no great objection, but to which we may as well call the attention of gas companies. In the first place, it is proposed to give to urban authorities, where no authorized gas-works exist in the district, the power to set up a gas undertaking. We see no objection to this, for wherever gas-works are likely to pay, private enterprise is certain to start them."

And in another part of the same JOURNAL you give the clauses relating to gas and water at length.

In reference to these observations, I ask permission to say a word or two in reply. I concur with you in thinking that there is nothing in these provisions which the companies need object to, provided the observation is limited to companies authorized by Parliament, and not to the others. The companies not so authorized cannot, I think, but look upon them as in the highest degree objectionable.

If I judge your observations rightly, you assume that, where there are any gas-works already existing, they are *ipso facto* authorized; but that is not the case, the bill says distinctly, authorized by Parliament or Provisional Order. Simply, then, the bill expressly authorizes urban authorities, where there is no company supplying gas under an Act of Parliament or Provisional Order in the district, to start competing schemes for supplying gas themselves.

It is true, as you have remarked, that the local authorities, before undertaking to furnish a supply of gas, must obtain a Provisional Order, and that this, to some extent, will be a protection; but we may be sure that, if this Act passes, the inclination for the future will be to give these powers to the local authorities in preference to the companies, and that if a company and a local authority were to apply in the same session for a Provisional Order for the same district, the latter would be sure to get it in preference to the former.

Roughly estimated, there are between 1400 and 1500 gas undertakings in the kingdom, and of these there are only between 400 and 500 authorized, consequently there would be about 1000 companies left entirely at the mercy of the local authorities.

I have been asked repeatedly within the last week if I thought any united action upon the part of the unauthorized companies would have any effect in getting rid of these provisions, and I have said that I doubt very much whether it would, for this reason. When we had the long parliamentary contest about the Borough Funds Bill, which extended over two sessions; the question of the unauthorized companies came up over and over again, and their recognition, in any shape, was always steadily and persistently refused. It was said if a company chooses to carryon its operations, independently of all public regulations, to supply gas of any quality it thinks fit, charge its own terms, and divide any amount of profit it can earn, it does so at its own risk, and is not entitled to any parliamentary protection. It is deserving of notice that the local authorities are not to be permitted to supply gas until they have obtained a Provisional Order which brings them under all the public regulations. The bill would, therefore, to some extent, be inconsistent in itself, if it recognized companies who carry on their operations free of all these regulations, while it would not allow a local authority to do so.

I feel, like you, some regret at the transfer of every gas undertaking to a local authority; but I agree with the remark that the tide has set in that direction now, and the time has passed for making any objection on principle.

This bill enables the local authorities and the companies to approach each other, and make their own arrangements in an amicable spirit, and, to that extent, it is favourable to the authorized companies more than otherwise.

I sent last week a print of the clauses relating to gas and water to all the companies belonging to the association, and as I have some left, I shall forward a copy to any others who may require it, whether belonging to the association or not.

WM. LIVESEY, Secretary to the Association.

Gas and Water Companies Association,
6, Victoria Street, March 20, 1875.

MR. MANN'S PATENT FOR SULPHUR PURIFICATION.

SIR,—Since my last communication I have *again* proved that it is incorrect to say that ammoniacal liquor will *not* remove the bisulphide of carbon from gas when used as I have stated.

Although it is apparently a waste of time to write any more on this subject, seeing that all I say is simply denied or distorted, yet I should have made a few further remarks, but that I have been informed the matter between Mr. Patterson and The Gaslight and Coke Company is still in litigation. This being the case, I refrain, merely expressing my belief that, should it ever come to trial, the result will establish my right to be considered the originator of the system of purifying now found in practice to work so well, and will confirm all that I have ever said or written on the subject.

Dorset Street, March 20, 1875. W. MANN.

[We quite agree with our correspondent, and think that, under existing circumstances, it would be unwise to continue the correspondence.—ED. J. G. L.]

Parliamentary Intelligence.

HOUSE OF LORDS.

THURSDAY, MARCH 18, 1875.

The Greenock Water Bill was reported, with amendments.

FRIDAY, MARCH 19.

The Cleveland (Skelton) Gas, and the Heckmondwike Gas Bills, brought from the Commons, were read a first time, and referred to the examiners.

HOUSE OF COMMONS.

MONDAY, MARCH 15.

The Cleveland (Skelton) Gas Bill, as amended, was considered; to be read the third time.

The Pontypridd Water, British Gas Company (Norwich station), and Oxford (Corporation) Water Bills were reported.

Petitions in favour of the Neath District Water Bill were presented from (1) Ratepayers of Neath, (2) Briton Ferry Local Board of Health; and in favour of the Pemberton Local Board Bill, from owners and ratepayers of Pemberton.

A petition against the Waterford Improvement Bill was presented from the Grand Jury of the County of Waterford.

Petitions against the following bills have been withdrawn:—George Smith Taylor and others, and Aire and Calder Navigation Company, as against Bradford Water and Improvement Bill; Ely Andrew and Henry Hall, as against Manchester Corporation Water Improvement; London and North-Western Railway Company, as against Pemberton Local Board Bill; Trustees of Thomas Dutton, Andrew Barclay Walker, and London and North-Western Railway Company, as against Widnes Local Board Bill.

The *locus standi* of parochial officers, ratepayers, and occupiers of Pontefract Park District, and Midland and North-Eastern Railway Company, as petitioners against the Pontefract Borough Extension Bill, has been disallowed.

TUESDAY, MARCH 16.

The Heckmondwike Gas Bill, as amended, was considered; to be read the third time.

The Newport (Monmouthshire) Gas Bill was read a second time and committed.

METROPOLIS GAS COMPANIES BILL.—Report that the Standing Orders have been, complied with, laid upon the able. Bill to be read a second time on Tuesday, April 6.

The Colchester Gas Bill was reported.

The petition of the Balsall Heath Local Board of Health, against the Birmingham Gas (No. 2) Bill, has been withdrawn; also that of the Lancashire and Yorkshire Railway Company, against the Pemberton Local Board Bill.

The Bradford Water and Improvement, Rochdale Improvement, Manchester Corporation Water and Improvement, and Stockton and Middlesbrough Water Bills, were referred to a committee, consisting of Mr. Arthur Peel (chairman), Mr. Randle Plunkett, Mr. Holms, and Captain Polhill-Turner; to meet on Thursday, April 8.

The Millom Gas and Water, Peterborough Water, East Northumberland Water, Weardale and Shildon Water, Market Rasen Water, and Longwood Gas Bills were referred to a committee, consisting of Mr. Baillie-Cochrane (chairman) Mr. Wells, Mr. Yeaman, and Mr. Dickson, to meet on Thursday, April 8.

WEDNESDAY, MARCH 17.

The Carmarthen Gas Bill, as amended, was considered; to be read the third time.

The petitions of the Birmingham Water-Works Company against the Birmingham and Staffordshire Gas, Birmingham (Corporation) Gas, and Birmingham Gas (No. 1) Bills have been withdrawn; as also that of Roger Leigh against the Pemberton Local Board Bill.

THURSDAY, MARCH 18.

The Cleveland (Skelton) Gas Bill was read the third time and passed.

The following resolution of the Standing Orders Committee was agreed to:—"That, in the case of the Waterford Improvement Bill, petition of P. Burrowes Sharkey, for dispensing with Standing Order 131 in the case of the petition of 'Grand Jury of County of Waterford,' against the bill, the said Standing Order ought to be dispensed with."

The Cleethorpes Gas, Eastbourne Water, Hindley Local Board, Kilmarnock Water, Longton Gas, and Truro Water Bills were reported.

The Neath District Water, and the Barton, Eccles, Winton, and Monton Local Board of Health Bills were reported, "preambles not proved."

The petition of the Great Western Railway Company against the Maidenhead Water Bill was withdrawn.

FRIDAY, MARCH 19.

The Heckmondwike Gas Bill was read the third time, and passed.

The Leicester Water Bill, as amended, was considered; to be read the third time.

The petitions of the Balsall Heath Local Board of Health, and owners, &c., in Balsall Heath, Oldbury, and Smethwick, against the Birmingham and Staffordshire Gas, Birmingham (Corporation) Gas, Birmingham (Corporation) Water, and Birmingham Gas (No. 1) Bills, were withdrawn.

METROPOLIS GAS COMPANIES (REGULATIONS) BILL.

Colonel MAKINS asked the honourable member for Truro if he will state to the House why, as there are 17 companies supplying gas within the area under the Metropolitan Board, the legislation proposed by the Metropolis Gas Companies Bill is limited to only nine companies, whilst the parliamentary notices for the bill included all companies supplying the district under the Metropolitan Board of Works.

Sir J. HOGG: In answer to the honourable member, I beg to state that although there are 17 companies supplying gas within the metropolitan area, eight of them supply outlying districts, and are not subject to the provisions of the Metropolis Gas Act of 1860. The Metropolis Gas Bill is an amendment and partial repeal of the Act of 1860, which expressly excludes from its provisions the eight gas companies alluded to by the honourable member. I cannot enter more fully into the question at present, but I would remark that the company in which the honourable member is interested objected before the

examiner on the ground that the Standing Orders had not been complied with upon the point referred to in the question, but the objection was disallowed.

THE METROPOLITAN BOARD OF WORKS AND THE GAS SUPPLY.

Colonel MAKINS gave notice that on Monday, March 22, he would ask the Secretary of State for the Home Department if his attention has been drawn to the fact of bills being introduced by the Metropolitan Board of Works, at great cost to the ratepayers, without any statutory authority enabling them to initiate legislation, especially in reference to the gas supply of the metropolis; and whether the Government propose to confer such power upon that body by special Act.

METROPOLITAN BOARD OF WORKS (PARLIAMENTARY EXPENSES).

Mr. SANDFORD gave notice that on Monday, March 22, he would move for a return from the Metropolitan Board of Works of all sums expended, from its establishment in 1855, in promoting and opposing any bills in Parliament, or in complying with the Standing Orders of the Houses of Parliament as to bills introduced, or opposing or supporting bills before committees of Parliament, or as to inquiries before Select Committees of both Houses of Parliament; specifying date of the session, the object promoted, the inquiry before Parliament, and the result of such bills promoted or opposed, whether withdrawn or passed.

SATURDAY, MARCH 20.

The petitions of ratepayers and consumers of gas in Tipton, and proprietors of iron-works and large consumers of gas in West Bromwich, against the Birmingham (Corporation) Gas Bill, were withdrawn.

BURGHS AND POPULOUS PLACES GAS SUPPLY (SCOTLAND) BILL.—This bill, which Sir Wyndham Anstruther obtained leave to bring in, on the 23rd of February last, has not yet been delivered.

HOUSE OF COMMONS COMMITTEES.

WEDNESDAY, MARCH 10.

(*Before Mr.* BATHURST, *Chairman; Lord* RANDOLPH CHURCHILL, *Mr.* MAITLAND, *and Sir* ARTHUR MONCK. *Mr.* BONHAM-CARTER, *Referee.*)

ASHTON-IN-MAKERFIELD LOCAL BOARD BILL.

Mr. ASPINALL, Q.C., Mr. MUNDELL, Q.C., and Mr. MICHAEL appeared for the promoters, the Ashton Local Board; Sir MORDAUNT WELLS, Q.C., Mr. SAUNDERS, Q.C., and the Hon. CHANDOS LEIGH for millowners and others.

Mr. ASPINALL said the bill was intended to empower the Local Board of Ashton to manufacture gas and to provide a water supply for the district, and for other purposes. The portion of the scheme with reference to the water supply would be opposed, but the gas portion of the bill was practically unopposed. For the purpose of showing the necessity of an improved water supply, he would give a short description of the locality and the measure intended by the promoters to provide the required additional supply. The town of Ashton was not at present included in any area of water supply. The town consisted practically of a long line of houses with one main street and some projections on either side. It appeared that there were, in addition to the town, several hamlets requiring an additional water supply—in fact there was a district covering 2649 acres, belonging almost entirely to Sir Robert Gerard, which required a supply of water. The population of that area in 1861 was 6561, and in 1871, after a period of ten years, it had increased to 7462; whilst the estimated population of the district at present was taken to be about 8000. It had been thought that the proper basis at which the population should be taken, to provide an adequate water supply should be 9000. Sir Robert Gerard, who owned such a large portion of the district, was strongly in favour of the bill. The people of the district were persons who were chiefly employed in collieries, and naturally required a considerable quantity of water to meet their wants. With regard to the history of the government of the district, the first local government which it possessed was a Highway Board. In 1869 a sewerage authority was constituted, and in 1872 the local board was created. It was on behalf of that board (the promoters of the bill) that he appeared. Unfortunately, in 1872, a serious outbreak of mortality occurred in the district, and it was so serious that the Local Government Board had their attention directed to it; and they then thought it right to send down an inspector to ascertain the cause of the disaster. That inspector was Mr. Radcliffe, who had had considerable experience in similar matters. The report first dealt with a description of the area of the townships, the number of the population, and the number of houses.

Sir MORDAUNT WELLS objected to the references made to the document unless the person who made the report was to be examined.

Mr. ASPINALL said that he would ask for an order for the production of Mr. Radcliffe. The water supply of Ashton and the district was partly obtained from wells; but the principal source of supplo was a steam-engine mill spring. The water from the wells was bad and polluted. At the time the inspection was made many persons who were living in cottages were compelled to use rain water, and to seek it from distant springs. It was suggested that the different sources of water supply in the district ought to be submitted to a careful examination, and that means ought to be taken to protect the sources of water supply from pollution. The committee of inquiry, which had been appointed, applied to the Corporation of Liverpool for assistance in the matter, and the guardians of Ashton had some hopes that the authorities of Liverpool might have been able and willing to give a supply of water from their pipes, which passed through the town of Ashton. There was a perfect willingness on the part of the authorities of Liverpool to assist the town of Ashton and the district around, but the people of Liverpool found that they had not enough water for themselves, and to abstract any considerable quantity of water from their supply would be adverse to their own interests; and that, therefore, they were not entitled, in the interests of their own constituents, to comply with the wishes of the people of Ashton. The promoters had made all the inquiries they could, and had made the suggestions which they thought necessary to secure the end in view, but they had failed, until at last the local board were induced to look to the quarter from whence they now sought to obtain powers to secure a better supply. There were three townships—Ashton, Billinge, and Pemberton—whose interests were somewhat conflicting, and it was agreed between those parties that a kind of reference should be made to a firm of water engineers, Messrs. Cawley and Newton, who were requested to make inquiries into the capability of the district to supply the three townships with water. They had only to deal with the matter so that a fair adjustment might be made to each town. Messrs. Cawley and Newton had made their decision, and designs for the construction of several reservoirs had been made on the basis of their decision. The estimate for the carrying out of the works was £20,000. Having spoken as to the necessity for the construction of additional water-works, and given the reasons which had compelled the local board of Ashton to seek powers to carry out a scheme for a better supply of water to the district, and a deliverance from the serious consequences which would ensue from an improper supply of water, he (Mr. Aspinall) proceeded to deal with the various petitions against the bill.

Sir M. WELLS said that at present he was really in the dark as to what principle of compensation the promoters intended to adopt. There was not a single word in the bill which indicated the quantity of water which the millowners were entitled to receive. He hardly knew how the case was to go on unless he had some information on that point.

Mr. MUNDELL said that Sir Mordaunt could only raise an objection to the preamble of the bill, and the point objected to did not arise on the preamble. He could not allow a greater compensation than 8,800,000 gallons, which was the capacity of the compensation reservoirs. The object of the promoters was to act in a beneficial manner to the millowners, and they would allow them 50,000 gallons per day. He thought that would satisfy Sir Mordaunt and the committee.

Sir M. WELLS said that if a clause were brought in defining the principle of compensation he would withdraw his objection.

Mr. MUNDELL agreed to do so, and evidence on the preamble was then called.

Mr. *Adolphus Moubert*, examined by Mr. MUNDELL.

I live at Garswood. Sir Robert Gerard is the owner of more than five-sixths of the township of Ashton. I have been the chairman of the local board of the district and connected with the district ever since it has been one. Ashton is about half way between Wigan and St. Helen's. It comprises about 6250 acres. The population has increased rapidly. In 1871 it was 7463. The present estimated population is about 8000. I have been advised that provision for water for about 9000 persons should be made. As many as 300 houses in the district are now about to be built. The people of the district are chiefly employed in mining operations and in lock and hinge manufactories. The present supply of water in our district is altogether insufficient. In dry weather the people go for water to different places, but that which they obtain is very stagnant. The local board was constituted in 1872, and we have received a visit from Mr. Radcliffe, who made a report as to the condition of the water in the district. He advised the removal of sewage from the brooks, and also that another supply of water should be obtained, and that certain wells should be shut up. In conformity with the recommendations contained in that report the wells were inspected and shut up, and an analysis of existing supplies of water proved that they were very bad. We were to have intercepting drains to remedy the condition of the water supply. At a meeting it was resolved to take steps to secure a sufficient and proper supply of water for the town. We attempted to obtain a supply from Liverpool, but we did not succeed. Our attention was then directed to some water-works at Ince, but the water there was hard. We failed to get a supply from Ince. My attention was next directed to obtain water by means of gravitation from the high grounds of Down Brook. Messrs. Cawley and Newton were engaged to give a decision as to the supply for the townships of Ashton, Billinge, and Pemberton. We employed an engineer, an agent of Mr. Bankes, who agreed to the decision given by Messrs. Cawley and Newton, who made a report, and upon which the local board acted. That report was carried out by our surveyor, and it has resulted in the present scheme. Pemberton has a population of 9000 or 10,000, and Billinge has 3000 inhabitants. I am sufficiently acquainted with the habits of the people to be able to state that a supply of water other than that from Down Brook is imperatively required. The colliery workings in the neighbourhood have affected every well in the district.

Cross-examined by Sir M. WELLS: The large proportion of the mill property is situated at Newton. The water supply for various purposes is of great importance to those mills. We commenced taking steps for a better supply of water as soon as we were advised to do so. We should have taken steps last year had not some arrangements been come to which rendered it unadvisable. Messrs. Cawley and Newton's report does not contain any reference to the question of compensation water.

The Rev. *William James Melville*, examined by Mr. ASPINAL.

I am the rector of Ashton, and have been there about six years. The rectory is in the largest village in the district. There is not at all a proper supply of water for the whole district. In summer one of the wells became dry, and we have had to get rain water. The condition of the water in my garden is very impure, but a great number of people come there for the water. In reply to me when I have spoken to them they say that they are obliged to come there because they can get water at no other place. The water there I do not think is fit for use. Some of the water from buildings gets into the brooks from which the people are obliged to obtain their supply.

Cross-examined by Sir M. WELLS: Between my rectory and the gathering-grounds there are several houses. The cause of the impurity of the water coming from the gathering-grounds to my house is, as far as I can gather, owing to the drainage of a number of houses.

Mr. *William Valiant*, examined by Mr. MUNDELL.

I am a manufacturer at Ashton, and also a lock and hinge manufacturer. The population of the town of Ashton is a little more than 3000 During the nineteen years I have lived there the inhabitants have got their water from wells. One is a steam engine well, which is about 200 or 300 yards from the centre of the town. It is the centre of a brook. It has been the principal source of supply for the inhabitants. At a greater distance there are other wells. They are about 500 yards from the centre of the town. Some little time ago the inhabitants used to get water from Jack's Brook. I use the water of the Down Brook for my own works. In the dry weather the current of water from which I obtain my supply is not sufficient to supply my tank. I cannot then get sufficient without using artificial means. A mill occupied by Mr. Yates is about 300 or 4000 yards from my works. There are no works between Mr. Yates's and my works which require water. We are the only two persons who take water in Ashton.

Cross-examined by Sir M. WELLS: The state of the water where I take it is almost clear. My engine is 20-horse power, and it requires 100 gallons per hour.

Cross-examined by Mr. CHANDOS LEIGH: I am a member of the Ashton Board. I know Mr. Bankes's estate. Most of the gathering-ground belongs to that gentleman, I believe. I know the catchwater drains will be on Mr. Bankes's estate, and the main supply of water would come from his estate. Mr. Bankes has a colliery ground.

Mr. *William Yates*, examined by Mr. MUNDELL.

I am a farmer, and was formerly a corn dealer, and used to carry on business at Ashton Mill. Between my mill and Golborne there are no other mills on the stream. When I worked my mill I had power of impounding water. Because I impounded the water, it very often occurred that the whole of the stream was dried up by stopping all the water that came down from above my mill. The people had to drink water from the field drains.

Mr. *Christopher Clark*, examined by Mr. MICHAEL.

I am a mining engineer and surveyor, residing at Park Lane. I have known the district about twenty years. Sir R. Gerard is the owner of nearly all the mines in the district. I am acquainted with the working of the coal mines underlying the district. The reservoirs that are proposed to be constructed will not be injured by the coals in the district. I know the wants and requirements of the district, which is growing in importance. In the way of erecting cottages I have made arrangements for about 300, and there is a great demand for them. I do not know of a single cottage being uninhabited. I have had constant applications for cottage accommodation. It is very likely that the trade of the district will be increased. The water supply at the present time is not at all equal to the requirements. The water which is obtained is unfit for human drink. In consequence of the mining operations extending the wells have been drained. Persons are subjected to great inconvenience—in fact, very many are drinking condensed steam.

Cross-examined by Mr. CHANDOS LEIGH: The colliers have to travel a great distance from their residences to the places where they are employed, and therefore cottage accommodation is being provided.

Mr. MICHAEL said there were a great number of witnesses whose evidence would be similar to that already given. The evidence as to the necessity of a supply of pure water being provided had not been cross-examined.

The CHAIRMAN (to the petitioners): You do not contend that the water supply is good?

Sir M. WELLS: I do not contend that the water is of a proper quality to be

supplied to any district; but what I contend is this, that inasmuch as the present state of things has been going on for years, and a valuable manufacturing district has sprung up, we are entitled to as much compensation as other millowners.

The CHAIRMAN: Therefore this class of evidence has no application.

Mr. *John Fairless*, examined by Mr. MICHAEL.

I am clerk to the local board and collector of rates, and have been assistant surveyor to the Highway Board. I know that the water had been found improper and unfit for use, after an analysis had been made. The rateable value of the district is £53,000.

Mr. MUNDELL said that there were only two classes of evidence to bring before the committee. If the petitioners admitted that water supply was required, they admitted that the health of the inhabitants was affected by the want of that required supply. To put an engineer into the box before the clauses having reference to compensation were entered into would only be a waste of time.

Sir M. WELLS said it was impossible to get much further with the case by the examination of the engineer.

THURSDAY, MARCH 11.

Mr. MUNDELL, Q.C., said, in obedience to the instructions of the committee, clauses had been prepared with regard to the compensation to be given to the millowners, and as Sir M. Wells had not cross-examined on the question of the purity or impurity of the present supply, he should ask for the committee's decision as to whether it was necessary or not to call the medical officer and the analyst.

The CHAIRMAN said unless the other side were going to rebut the evidence that had been given, the committee would be prepared to accept the fact that the water was impure.

Sir M. WELLS said at present he was scarcely in a position to say that there was a necessity for an improved supply.

Mr. MUNDELL said he would take upon himself the responsibility of not calling any further evidence upon that point.

Mr. *Goldsworth*, examined by Mr. MUNDELL.

I live at Prescot, and am surveyor to the Ashton Local Board. I have had a great deal to do with sanitary matters, the drainage, and the utilization of sewage. The effect of the scheme which has been prepared would be to intersect the sewage from all the various parts of the district, so that no sewage would fall into the Down Brook. The sewage farm would be 125 acres, and the effluent water would flow back to the Down Brook. All the sewage of Ashton will be removed from the brook if our proposed works are carried out. Before I proceeded to lay out the water-works I had received from Messrs. Cawley and Newton their report as to the gathering-ground. They divided the gathering-ground between Ashton, Billinge, and Pemberton, the portion for Ashton being 500 acres. I laid out the works as they appear in the bill. I placed the storeage reservoir very nearly, though not quite, on the spot recommended by Messrs. Cawley and Newton. Mr. Newton suggested that the capacity of the reservoir there should be 12 millions gallons. My plans are for over 16 million gallons. I followed Mr. Newton's recommendation as to the direction of the catchwater drains. The first compensation reservoir contains 2,800,000 gallons, the second 2,478,000 gallons, and the small one 1,500,000 gallons. The water from the whole of the 500 acres would not naturally find its way to the Down Brook. By shifting the position of the storeage reservoir I obtained 60,000 acres more han Mr. Newton proposed. The gathering-ground is under pasture, and slightly cultivated. There are three or four farmhouses at the upper extremity. The water is to be procured always by gravitation. I estimate that the storeage reservoir will contain sufficient for 130 dry days, that is on the supposition that a certain quantity will come into the reservoir during even the driest weather. We estimate the population in 1870 at 9000, and propose to supply 180,000 gallons a day. Of that quantity 20,000 gallons will be supplied to 100 houses on the opposite side of the watershed of the Down Brook, and will not return to that brook. The remaining 160,000 gallons will be used alone in the township of Ashton, and will return over the sewage farm to the Down Brook at the lowest point of the township. The compensation reservoirs are to be constructed to give 50,000 gallons per day. The estimated cost of the works is £19,953.

Sir M. WELLS said he should not raise any question on the estimates, so far as the proposed works were concerned.

Examination continued: We have a small sewage farm of seven acres, and I have ascertained that about two-thirds of the water flowing on flows off again. I therefore expect the same proportion from the larger farm. It will flow off pure, so far as appearance is concerned. There is a town between Ashton and Newton called Golborne, with a population of 3000. That town drains into the Down Brook.

Cross-examined by Sir M. WELLS: Mr. Lee has building land near the proposed sewage farm, and a residence about a mile from it. I am not aware that Mr. Lee and his agent will oppose the sewage farm scheme. If they do they will make a mistake.

The CHAIRMAN said the committee could not accept the sewage farm as an existing fact, but they would assume that if the farm was not constructed more water would go down the Down Brook, though it would be a little dirtier.

Cross-examination continued: My plan probably shows on the face of it 572 acres gathering-ground, but the direction of the water on a small portion of that area is a disputable point. According to the deposited plan the storeage reservoir will contain 16,900,000 gallons, and not merely 15 million gallons. Under the gathering-ground there is coal. If Mr. Bankes sunk a pit in any part of it, I would not undertake to say that fully one-half of the water would go into the mine. I am not aware that that is the usual calculation. I do not know that in that case it would find its way to the Down Book. I have not any doubt that we shall get the quantity we calculate upon. A considerable number of the inhabitants of Ashton are supplied with water from the red sandstone, by means of surface wells.

Sir M. WELLS said he was prepared to show that there were millions of gallons to be obtained from the red sandstone without interfering with the Down Brook.

Some discussion ensued on the admissibility of such evidence, and on the right of the learned counsel to cross-examine the witness as to the merits of an alternative scheme.

The COMMITTEE ultimately ruled that while they did not object to the petitioners going into the question of supplies actually in existence, no alternative scheme must be set up.

Cross-examination continued: The township of Ince has pumping works at Golborne. There are works at Parkside, obtaining water from the red sandstone. I cannot tell why the present bill was brought in without any clauses for giving compensation to the millowners. The local board were most anxious to meet the wishes of the millowners, but I cannot explain why there is that fault in the bill, if it is a fault. We called upon the millowners. I cannot say the date, but I had the deposited bill with me at that time. The population at present is 8000. The well interest is rather an important thing for the town proper.

Cross-examined by Mr. CHANDOS LEIGH: There is no clause in the bill protecting Mr. Bankes's rights that I am aware of. So far as he is concerned, there are no compensation reservoirs at all. All the water supply, except from 60 acres belonging to Sir R. Gerard, will come from Mr. Bankes's land. The catchwater drains will be under the surface, and will not interfere with the use of the land. The drains are to be laid so as best to utilize the water. I have not taken into my calculation any supposition that the population may increase beyond 9000. We only require six inches to flow into the drains. The size of our reservoirs will prevent our taking more than six inches. If we take any more than that it will run to waste. My impression is that the greater part of the gathering-ground is simply pasture, but I have not made any calculations of the proportion of arable and pasture. There are four farms on it. I do not think there are seven or eight farms there. The future, beyond 1890 has never been taken into consideration in any way in preparing the scheme. It was not with reference to that distant time that we proposed to take 500 acres. It will be necessary to have drains to intercept the sewage and colliery water. We shall certainly have for our own protection to put such drains on Mr. Bankes's land.

By Mr. MUNDELL: The landlord will be compensated for any injury done to his land under the general Acts. There are no coal measures worked on Mr. Bankes's land at present. The tank we shall make will not allow us to take more than 180 million gallons a day in dry weather. In wet weather the surplus water will flow into the brook. If a colliery were started there and took away the water, the millowners would, of course, be affected by it.

By Sir M. WELLS: There is nothing in the bill to prevent our coming to Parliament on a future occasion to take double the quantity we now ask for; but we have no intention of doing so.

Mr. MUNDELL: If you do, the compensation will be doubled.

By the REFEREE: The storeage reservoir will not exhaust the whole natural flow in dry weather.

Mr. *John Newton*, examined by Mr. MUNDELL.

I am a civil engineer at Manchester. I prepared the report referred to, and proposed a plan for constructing water-works at Ashton. I consider the gathering-ground to be the best source of supply. I do not think a supply could be obtained at any other place so near the town. We take the whole 500 acres in order that we may have a margin, which would enable us to turn off a portion if it became too polluted. If there was an under-drain by a mine the millowners would have to suffer as much as Ashton. In 1890 I calculate the population will be 9300, but we always find that a portion of the population do not take the water. We therefore propose to provide for 9000. I believe the gathering-ground is a little less than 500 acres. The drainage area at Golborne is 3100 acres. The height of the gathering-ground is about 340 or 400 feet. The residue after the 500 acres are taken is not quite so high, but the rainfall there would be the same. The gathering-ground at Newton is as much as 6000 acres. That is due to a great extent to a brook that empties into Newton Mere. I proposed in my report that the storeage reservoir should hold 12 million gallons. The plans are for 16,900,000 gallons. I have checked the measurements, and find that estimate correct. The average annual rainfall for a great number of years is 36 inches. I have kept gauges at Bolton, about 12 miles away, for many years; 1868-69-70 were dry years; the driest being only 28 inches, and the average of the three 32 inches. Taking 28 inches, and allowing 14 inches for evaporation, we could give 435 million gallons daily if we took the whole fall. We are, therefore, not going to take even one-half as much as it would be possible to impound. All the surplus will pass down the stream. There are no sites in the immediate locality suitable for the construction of large reservoirs. The minimum flow of the stream I should think would be as low as 40,000 or 45,000 gallons a day in a dry season. About 20,000 gallons of the 180,000 gallons will go into the river Douglas. In a moderately dry summer probably 12,000 gallons of the 160,000 would return to the Down Brook, the remainder being accounted for by evaporation. If there were no sewage farm more would flow into the brook, but it would be dirtier. I have calculated the capacities of the reservoirs, and I find that the figures given by Mr. Goldsworth are practically correct; 50,000 gallons can be given as compensation in place of the 45,000 gallons or 50,000 gallons that we take away by the catchment. All the water is to be taken and returned to the brook above the highest millowner. There are six mills in which steam power only is used, but the owners of all the mills would not allow me to inspect their works. In the summer months they will get more water than they do now. As a rule the quantity that comes out of a town after being used is very nearly the same as that which comes in.

By Sir M. WELLS: Mr. Cawley, my partner, is responsible with me for the report that was given in this case. The clauses introduced into this bill this morning with regard to compensation are very similar to those of the Padiham Local Board Bill last year. One-third is by no means the ordinary proportion given as compensation. It is desirable that millowners should have water as pure as possible, but it is not absolutely necessary that the water should be quite pure. The 500 acres is not the only source from which the millowners get pure water at present. The heads of all the little streams that join the Down Brook are pure. When representing millowners I do not think I have over and over again claimed one-third compensation as the ordinary parliamentary rule. I have only claimed what has been taken away. I have known instances in which less than the minimum flow in summer has been given as compensation. Taking the three driest years, the rainfall is 32 inches. Allowing 14 inches as compensation, that would leave 18 inches to be utilized. If colliery workings were carried on under the 500 acres, it does not follow that all the water pumped out would go into the Down Brook. It would depend upon the position of the shaft. When I sent in my report I did not contemplate water compensation. I did not consider that compensation at all might be necessary, as the whole of the water would be returned to the brook. There is nothing in the bill to prevent the local board from giving the whole compensation from reservoirs below the higher reservoirs. This water might not be so pure as that which would be obtained from the higher reservoirs. The drains on Mr. Bankes's land were never intended to take all the water on that land. They might perhaps do so, but the reservoir would not be able to store it.

Mr. *Fairless*, recalled by Mr. MUNDELL, said several gauges were taken to test the flow of the water, but these were taken by him personally. They were taken by him once every Saturday in March, April, and May. It was generally about one o'clock in the day. He measured the brook at a point very near the first compensation reservoir, and about half a mile above the storeage reservoir. In March he found the flow 268 gallons per minute, 385,920 gallons per day, or 11,963,520 gallons for the whole month. In April the flow was only 144,000 gallons, and in May only 57,760 gallons. Of all the petitioners only two used water as motive power. The paper mills refused to give any information on that point.

Cross-examined by Sir M. WELLS: I did not adopt the usual mode of gauging streams by the weir. My experience in gauging is limited to this case.

By Mr. MUNDELL: There was so little water that at one time it might have been measured in a can. It did not, therefore, require much scientific experience.

Mr. *James Glaisher*, examined by Mr. MUNDELL.

I know the rainfalls of this district. The rainfall at Wigan is 40 inches. At Rainford Hall it is 36 inches. I think it is quite fair to take the average at 38 inches over the gathering-ground. From observations taken all over the country it is found that, deducting one-sixth from the average rainfall, gives the average of three dry years. I allow 14 inches for evaporation. I have no record of any year so low as 23 inches in this district, but I have one year 29 inches.

Dr. *Frankland*, examined by Mr. MUNDELL.

It is proposed to subject the sewage to intermittent filtration. The effluent water is quite suitable for every kind of manufacture, except perhaps brewing. Although not chemically pure, it is free from all fœcal and excremental matter. If a sewage farm is properly carried on, it is no nuisance.

Sir M. WELLS said if these points were gone into he should have to call gentlemen resident not far from the proposed farm. If it had been known that the sewage farm question would be dealt with, all the gentlemen in the neighbourhood would have petitioned against it.

The CHAIRMAN said the committee were of opinion that the sewage scheme was not a matter for their consideration.

This concluded the case for the promoters, and Sir M. Wells then called

Mr. *B. B. Glover*, who said: I am a surveyor, and agent for Mr. Legh. I am well acquainted with the town of Ashton, and with the works on the banks. The Down Brook rises at Winstanley, flows through Ashton, then to Golborne, where the two first mills are, then to Newton, and ultimately into the Sankey Brook. The mills at Golborne have 24-horse power. Mr. Brewis employs about 1300 men, and 1880-horse power. The brook flows on the lower boundary of Mr. Legh's park, and has been converted into a lake of about 20 statute acres. Four or five large residences have been erected by the side of the lake. As regards Mr. Legh's property, it is a matter of importance to get as much pure water as possible, and the abstraction of the flood water would be very injurious to his estate.

By Mr. MUNDELL: The population of Newton does not in the main derive its water supply from the Down Brook. The inhabitants have private wells. I do not know that all the sewage from Golborne comes into Mr. Legh's lake. The lake is not foul at present. I have not heard many complaints of its foulness. I do not think the estate on which the five houses are built has been in the market for 40 years, but it has been for a long time. Since I have been there, 10 years, only one building plot has been taken. I do not think people object to building there because the lake is such a nuisance.

FRIDAY, MARCH 12.

Mr. *Brewis*, examined by Sir M. WELLS.

I am a cotton-spinner at Golborne. My mills are of 1880-horse power, and I employ 1300 hands. The mills were commenced in 1836. The Down Brook forms the principal supply to my works. In summer time the supply from the brook is inadequate. We have never absolutely had to stop the works, but we have been very near it, without a drop of water to spare. It is of very great importance to my workpeople to have the water as pure as possible. We use at our mills 1,300,000 gallons per day. The flood waters are of great importance. In the summer we use the water over and over again; but if a heavy rain falls, the flood-gates are opened, and we wash away the hot water and get a fresh supply, which will carry us on for a week. We employ about 100 hands from Ashton. The present bill seems to me to take the pure water which we want, and to give us the sewage water which we do not want.

Cross-examined by Mr. MUNDELL: I have had fever in my house, caused by the effluvium from the water which has been used over and over again at my mill. As a rule we are only obliged to use the water over and over again in the dry summer months. At present the population of Golborne are supplied for domestic purposes from wells, but they are about to have water from the Ince works. There are not ten water-closets in the whole of Golborne, so that no sewage runs into the brook except the topwash. I left my residence on the bank of the brook because of the offensive smell.

Mr. *Henry*, examined by Sir M. WELLS.

I am a cotton-spinner, and a lessee for 999 years under Mr. Lee. I have been in possession of my mills 13 or 14 years. They are on both sides of the Down Brook. I employ about 250 hands. Any abstraction of pure water from the brook would be detrimental to my interest. It is very fair water at present for manufacturing purposes. There can be no doubt that the flood waters are beneficial in clearing out the brook.

Cross-examined by Mr. MUNDELL: I am about half a mile nearer Ashton, following the course of the brook, than Mr. Brewis. I have reservoirs. I never use the water over again, even in summer.

Mr. *Gillespie*, examined by Sir M. WELLS.

I am a lessee, under Mr. Lee, of the Newton Paper-Works, and employ about 250 hands. I use about 576,000 gallons every 24 hours. It is a matter of the very greatest importance to me to have the water as pure as possible. The flood waters in the summer have a tendency to cleanse the brook, and do a great deal of good. It would be very prejudicial to me if the water were impounded in the summer time. I make from 30 to 35 tons per week of printing paper.

Cross-examined by Mr. MUNDELL: My works are about 500 yards below Newton Mere. They were built in 1860. I have always taken water from the brook. I take about 150 gallons per minute from a well in my works, besides 400 gallons per minute from the brook. I have always been able to get that quantity in summer without any difficulty. I have never had to stop my works for want of water, but the quality is not always what I could wish. I dare say I might have got the whole 550 gallons per minute from the brook, but I sunk the well, because for some purposes we require clear spring water.

Mr. *M'Corquodale*, examined by Sir M. WELLS.

I live at Newton-le-Willows, on the bank of the lake. I am a tenant under Mr. Lee. I have expended at least £5000 in extending my house. I am building another house at present. If the promoters of the bill take away any of my water, it will have a most detrimental effect on my residence. The water in the lake is not so clear after a flood as before, so far as appearance goes. I have pipes from the lake to my dwelling-house for domestic purposes, but not for drinking.

Cross-examined by Mr. MUNDELL: I am chairman of the Newton Board, and am in favour of all sewage being removed from the brook. I have inspected works with that object in view. I have drunk the water from the Newton Mere on some occasions when there has been a change of servants in my house, but I have been very sorry that I did so. That was merely a matter of taste. I should think there are very few water-closets in Ashton. I have never considered the question of whether the sewage of Ashton affects the mere. I always leave Newton in the summer time. I have complained to the Golborne authorities about their fouling the water, and have written more than one letter to them on the subject.

Witness: I should mention that I also appear here on behalf of the Liverpool Farm School. It is a reformatory for boys. It is a little above the Down Brook, and recently the committee had taken a corn-mill a little below the reformatory. I think there are about sixty boys in it.

Cross-examined by Mr. MUNDELL: There is a well to supply the reformatory with drinking water. The rent of the corn-mill is about £10 a year, I believe.

Mr. *J. E. Pardey*, examined by Sir M. WELLS.

I am agent for Mr. Lee, who is lord of the manor at Newton. The lake was formed in 1852 or 1853. In the formation of the lake and roads Mr. Lee expended £7000 or £8000. The land on the banks was let out for building purposes. The first house built was Mr. M'Corquodale's, then Mr. Birley's, then Mr. Wesley's, and next Mr. Mason's. The supply of water to the lake is principally from the Down Brook. A small supply comes from Haydock, but it is very small indeed, the stream not being more than two feet wide. The lake is the southern boundary of Golborne Park. The house there has had about £8000 expended upon it recently. Mr. Pearson, the high sheriff of Lancashire, lives there. Within the last month I have gone up the whole length of the brook. The water was certainly not pure, but it was not very foul. As I got near the gathering-ground I saw many inlets of colliery water. The mere is well stocked with fish at present. Mr. Lee grants permission to all the colliers and workmen to fish there. During the summer months, from May to October, upwards of one hundred a week fish there. If we are to get a large quantity of sewage water as compensation, it will have a most injurious effect on the fish, as well as upon the building operations and trade of the district. At present Mr. Lee and his tenants have the first take of pure water in the brook. Mr. Lee has two corn-mills. Mr. Walmsley rents one at £40 a year. The rent of the mill occupied by the Liverpool Farm School and 19 acres of land is £120. I estimate the value of the mill there at £80 a year. Any quantity of water might be pumped up from the red sandstone in the district.

Cross-examined by Mr. MUNDELL: Mr. Walmsley's lease has expired, but he is going on now the same as before. Mr. Lee never raises to old tenants. If 100,000 gallons of water per day were taken, I should think the effect on Newton Mere would be very sensible. During floods the water is not so pure in the mere as at other times, for the mud is stirred up, but after a few days it is clearer than it was before. The mere is not very foul at present, but I should not like to drink it. It is contaminated with sewage and surface drainage. A great deal of artificial manure is used in the district. It would undoubtedly be a great advantage to get rid of the sewage both from Ashton and Golborne. I think a sewage farm might be made at Newton. I should not consider the water supplied from the compensation reservoirs as any compensation at all for the pure water which would be abstracted.

By the CHAIRMAN: The mere practically acts as a reservoir, for sometimes the water is low, and then the mills below the mere suffer, just in the same way as we should suffer if the water were impounded in the proposed reservoirs.

Mr. *Birley*, examined by Sir M. WELLS.

I reside at Newton, and am a tenant of Mr. Lee. I built one of the houses on the lake. I concur in the evidence of previous witnesses.

Cross-examined by Mr. MUNDELL: In the summer time my house is not as comfortable a residence as it was some years ago, on account of the smell from the brook. I attribute the smell to the sewage which I suppose comes into it, and I should be very glad to have that sewage out of it. In foggy weather there is a bad smell even when the lake is pretty full.

By the CHAIRMAN: St. Helen's is about five miles from my house to the south-west, and the smoke from the chemical works there comes up.

Mr. *Hunter*, examined by Sir M. WELLS.

I am the responsible water engineer for the borough of Wigan. I was consulted by Mr. Lee and his agent and tenants and millowners in reference to the proposed scheme now before the committee. I surveyed the gathering-ground, and found the area to be 572 acres. I measured the capacity of the storeage reservoir according to a copy of the deposited plans, and calculated it at 15 million gallons. The compensation reservoirs will hold 4,200,000 gallons, 2,500,000 gallons, and 1 million gallons. The two last are to be supplied from the stream below the storeage reservoir.

Sir M. WELLS: Of course impounding the water there would materially interfere with the natural flow, and be very injurious to my clients?

Witness: I think so.

Sir M. WELLS: What do you say as to the sufficiency of the storeage for domestic use, and the compensation to millowners?

Witness: I took the population of Ashton at 8000, and at 20 gallons per head that would give 160,000 gallons per day. According to the capacity of the storeage reservoir, that would give a supply for 94 days only.

Sir M. WELLS: I need hardly ask you if that is sufficient?

Witness: About half. I do not think any storeage is sufficient that is less than 160 to 180 days supply.

Examination continued: From 1868 to 1874 were dry years, and taxed the resources of nearly every water-works in the kingdom. During the whole of my experience I never heard of such compensation as the promoters propose. The compensation in this case ought to be one-third of the available rainfall.

Sir M. WELLS: Is there anything in this case which takes it out of the ordinary rule of one-third?

Witness: I am not aware of any.

Sir M. WELLS: Can you suggest to the committee any state of things here that would create an exception?

Witness: No.

Examination continued: I estimate the available rainfall over the 500 acres at 18 inches. If they only want six inches there is no occasion to take 500 acres. If the promoters take only six inches, the millowners would be entitled to one-third of that, and the remainder of the 18 inches should be allowed to find its natural channel. If the promoters take more than six inches, the landowners are entitled to one-third of what they take. There is nothing in the bill to prevent the promoters taking the whole 18 inches. The catchwater drains would take the whole.

Sir M. WELLS: Supposing the committee say it is proved to their satisfaction that six inches in the gathering-ground would be sufficient for the demands of the public, then you say they ought to be limited to six inches.

Witness: Certainly.

Sir M. WELLS: But supposing they have the power to take more than six inches, then you say there ought to be a clause giving the landowners one-third of the quantity they take.

Witness: Yes.

Examination continued: The two lower compensation reservoirs would give no compensation at all. I do not know of any district in which fresh water is of greater importance than in the Newton Valley.

To prevent the loss of time that would be occasioned by recalling this witness, it was agreed that Mr. Chandos Leigh should now examine him as a witness on behalf of Mr. Bankes.

Examined by Mr. C. LEIGH: The present scheme would be very injurious to Mr. Bankes's interest. The catchwater drains would interfere most materially with the surface of the land, and take away the whole of the water from Mr. Bankes's land without, as far as I can see, any particular object, because if only six inches of available water is required it is unnecessary to take 500 acres; 170 acres would in my opinion suffice for the present wants of the district. So far as Mr. Bankes is concerned, there ought to be a clause limiting the area to 170 acres, or limiting the quantity of water to six inches.

Cross-examined by Mr. MUNDELL: I know that under the general law the promoters may take the whole of Mr. Bankes's springs and pay him for them.

Mr. MUNDELL: Is there any more damage to be done than can be compensated for under the general law.

Witness: I cannot exactly answer that.

Mr. MUNDELL: You need not answer it unless you like. Will you tell me you won't?

Witness: No; I would tell you if I could.

Mr. MUNDELL: Supposing we had only taken 170 acres, would it have added to or diminished the expense of forming the storeage reservoir? Must not the storeage reservoir have been increased in proportion to the diminution of the acres?

Witness: I cannot say that it must.

Mr. MUNDELL: If we can only take away as much as will fill a reservoir of 16 million gallons, how are you injured whether we take 500 acres or not? We should fill our reservoir during the wet season, and of course all the surplus would run off.

Witness: You could do the same thing with 170 acres.

Mr. MUNDELL: In those cases where one-third has been given, has not the whole of the water been taken away, so that not a drop of it could ever get back to the millowners?

Witness: No.

Cross-examination continued: If you take 180,000 gallons for Ashton, you ought to give the millowners 60,000 gallons. I do not think there is any difference between a millowner living upon the Down Brook between the reservoir and Ashton, and one who lives at Golborne, with reference to the question of compensation. The 120,000 gallons which will flow back into the brook from Ashton will be in a state of sewage. I have not seen the Down Brook in dry

weather. You could not take the whole of the available water by the works as now proposed, but you might hereafter by arrangements with the landowner.

Mr. MUNDELL: Mr. Newton says he has measured the storeage reservoir from the plan, and it is 16 million gallons.

Witness: I rather suspect the discrepancy may be accounted for in this way. Perhaps he calculated from the sections of the original plan; I only had a lithographed copy, and such a copy is sometimes shrunk.

Cross-examination continued: I believe there are many cases in which no water compensation has been given, and the millowners have been left to their remedy as being injuriously affected.

Re-examined by Sir M. WELLS: The compensation given to the stream at Wigan is 800,000 gallons per day, the watershed being 2850 acres. None of the pure water will be returned to the stream in this case.

Mr. MUNDELL: Did not Wigan come to Parliament again on the very ground that the compensation given to the landowner was too much?

Witness: I believe they did so.

The CHAIRMAN: Did the committee reduce the quantity of compensation?

Witness: No; they certainly did not. The compensation now given day by day is 800,000 gallons.

Re-examined by Mr. C. LEIGH: No compensation reservoirs are to be made on Mr. Bankes's land.

Mr. *Joseph Jackson*, examined by Sir M. WELLS.

I am engineer to the Bolton Corporation Water-Works,and to the Rivington Water-Works belonging to the Liverpool Corporation. I concur generally in the evidence given by the last witness. I consider that one-third ought to be turned into the Down Brook from the point where they intersect it. It is evidently their intention to absorb the whole district. It is the universal rule that the first thing to be done in establishing water-works is to provide for the millowners. The riparian owner is always entitled to the first take. Whether the storeage is sufficient or not to hold the whole of the water of the district, the millowner is entitled to one-third. The one-third does not depend upon the quantity actually given out, but it is an absolute quantity to which the landowner is entitled. It is nonsense to talk of making provision for the requirements of the district up to 1890. It cannot be any compensation to give merely the minimum summer flow. I do not think the sewage water will ever come back to the stream in any large quantity. The absorption that takes place on red sandstone is very uncertain.

Examined by Mr. C. LEIGH: The contemplated works will deprive Mr. Bankes of every drop of water on his land. He has a large quantity of coal under his estate. I have no doubt the whole of the water would be carried off by the catchwater drains. He ought not to be left without water to carry on any works he might wish to establish there. The promotors have not taken the future into consideration with regard to the supply they are asking to be allowed to give, but they have taken it into consideration with regard to the gathering-ground. I do not think it would be a great expense to place compensation tanks on Mr. Bankes's land.

MONDAY, MARCH 15.

Mr. *Lee*, examined by Mr. C. LEIGH.

I am a civil engineer and land agent, and have been in practice more than 15 years. I am acquainted with Mr. Bankes's estate. There are three streams on it which are separated by rising ground, and are joined together at the lake. The proposed catchment drains will follow the line of the stream, and their effect will be to drain the land dry. The works will be very injurious to Mr. Bankes's property. The whole of the day weather flow will be absorbed. The catchment drains will interfere with the laying out of the ground, and also make it very difficult to deal with the sewerage. The proposed works will, in my opinion, depreciate the value of the estate in every way.

Mr. *T. Shortrede*, examined by Mr. C. LEIGH.

I am agent to Mr. Bankes. He has no wish to offer a factious opposition to the bill, and desires to deal as liberally as possible with the promoters. His sole object is to protect his rights. He has 4000 or 5000 acres. There are five or six farm-houses on his estate, and two or three cottages. Water will be necessary to develope the resources of the estate. It would be impossible to make it a separate coal-field without water.

Cross-examined by Mr. MUNDELL: A portion of the coal under Mr. Bankes's land is being worked now. The seams are about 200 feet deep. There is a shaft close to the edge of the 400 acres. I should advise Mr. Bankes to sink another shaft when the day comes.

Mr. MUNDELL: What day is that—the day of Doom, or the Greek Kalends?

Witness: It depends on the rate at which the works are carried on.

Cross-examination continued: At the pit, about 100 yards from the edge of the 400 acres, about 200 men are employed. Since I have been there the number has not increased.

Mr. *W. Kelly*, examined by Mr. C. LEIGH,

I am a mining engineer in Wigan. I am well acquainted with Mr. Bankes's estate. Under it there is some of the best coal in the Lancashire coal-field. The present pit cannot work the whole of the estate. The gathering ground is cut up by two large faults,which will necessitate separate and distinct openings. It would be absolutely necessary to sink a shaft within the gathering-ground in order to obtain the coal. The loss to Mr. Bankes by the carrying out of the proposed scheme would be extremely great. I estimate that, taking only the upper coal, there are 35 million tons there.

Cross-examined by Mr. MUNDELL: Of the 400 acres about 50 can be worked by the existing shaft. I do not know where the water is obtained for the present shaft.

This concluded the case on behalf of Mr. Bankes.

Sir MORDAUNT WELLS then addressed the committee on behalf of the millowners. He said, except for the peculiar mode in which this case had been conducted, he should have thought there could be no doubt whatever that his clients were entitled, as a matter of strict justice and strict legal right, to the first take of the water in the Down Brook, and it was a mistake to suppose that any foreign body could come into the districtand take the water. Parliament had said there might be special cases in which the riparian owner could be compensated, and so far they had broken down the principle of the rights of property. He appeared now to defend the rights of property, and to contend that Mr. Lee was just as much entitled to the user of the water as to the user of any other property that he possessed. It was for the committee, in the first instance, to look at those rights to ascertain beyond all doubt what had been the user, and having ascertained that, to decide what compensation should be given to the riparian owners. In no other bill that had been before Parliament for the last 30 years had it ever been questioned for one single moment that the rights of the riparian owners were entitled to the first consideration. It was not a right dependent on any decision of a parliamentary committee, but a common law right, and all that the committee had to do was to do justice based upon that law. It had never been considered that a riparian owner wasin a different position in respect of the user of water than in respect of the user of his property. The present bill did not afford, in the first instance, the slightest intimation to the millowners of the amount of water compensation they were to receive. What was the object of introducing such a bill? Evidently they did not originally intend to give any compensation. Messrs Cawley and Newton's report was altogether silent upon that question. Nothing could be more unfair or unjust than their statement in that report that, on the information they then possessed, they doubted the necessity of providing water compensation for mines, but that if it should be thought necessary, it must be done by means of reservoirs constructed at points below the proposed catchment area. Mr. Newton knew there was a large and important milling interest which must be necessarily affected by the diversion of any water that fell on the gathering ground, yet he ignored that matter altogether. Although Mr. Newton had been challenged to give a precedent for such clauses as finally were brought forward, the promoters case was closed without any such precedent being mentioned. It was rather a strong measure for the promoters to introduce such a bill without beifig able to support it by any previous Acts. The bill, too, professed only to take six inches of rainfall, but there was not a single clause to tie them down to six inches. The power to take the whole rainfall of 18 inches remained to be exercised by them if they thought proper, and his argument was, that it was the universal practice of both Houses of Parliament that as such a power was sought in the bill, now and now alone were the millowners entitled to full compensation upon the basis of taking the whole of the water from the 500 acres. The committee could only come to one decision as to power being asked for to take the whole rainfall; and that being so, he trusted they would say that the riparian owner was entitled to have his compensation based upon that parliamentary power which the promoters sought in the bill. He hoped such a vice would never creep into legislation as giving powers to any body of men to take more water than they professed to want, and leaving the aggrieved person to his remedy at law. He represented the owner of the stream, and he stood upon his legal right, and he asked the committee to do justice by giving him the compensation to which he was entitled. It was not a question as if the promoters were offering ample compensation both as to quantity and quality. They only offered the minimum summer flow and that of contaminated water. If the millowners did not now get what they were entitled to, they never would. Turning to the question of the works proposed, the learned counsel said the committee could not pass that portion of the preamble which referred to the works unless they ignored the evidence given by Mr. Hunter. It was evident that the scheme had been drawn up in a hurried manner, and ought to be postponed, after the statement of such an experienced engineer as Mr. Hunter. His clients had been in possession of the stream for many years, and if the committee did not think it necessary to postpone legislation, he asked that the bill might be so shaped as to be based on strict justice, that justice resting upon the common law rights of the riparian owners.

Mr. C. LEIGH said, on behalf of Mr. Bankes, he did not wish to offer any factious opposition to the bill. He admitted that a water supply was required for the town of Ashton. All he wished was to protect his own interests in that matter. It was against his wish to part with one single acre, and while he admitted that there were times and occasions when private interests must yield to those of the public, the gentlemen who had to part with their property compulsorily ought to suffer as little injury as possible. Under the general Act the only remedy was money compensation in such cases cases as those of Mr. Bankes. There was no guarantee against draining off the whole of that water supply, and the moment money compensation was given the landowner was barred from recovering any water compensation whatever quantity was taken. The promoters, with a capital of only £20,000, could not possibly afford to give anything like an adequate compensation in money to Mr. Bankes for the injury he would suffer. The fact that the property was not yet developed only made the difficulty of money compensation all the greater. It was in evidence that the get of coal under the estate was upwards of 35 million tons. There was at present water there suitable for the supply of any new pits that might be opened, and for the supply of any colliery population that might spring up. How in the world could the promoters compensate for all this in money. They might either limit their catchwater area, in accordance with their own evidence that they only required 6 inches; or, if they would not do that, but insisted upon having the whole 500 acres, let them increase their storeage reservoir sufficiently to give him the supply to which he was entitled. Whatever quantity was given to Mr. Bankes would simply be used by him and then sent down to the millowners. He did not want what was commonly called water compensation, but simply a water supply. Mr. Bankes's agent, Mr. Shortrede, had told the promoters that he did not wish to offer any factious opposition; all he wanted was that they should so construct their works as to leave him some water.

Mr. MUNDELL replied on behalf of the promoters. He said it was perfectly plain that there was an urgent necessity in Ashton-in-Makerfield for the bill to pass.

The CHAIRMAN said that point was granted.

Mr. MUNDELL said his friend Sir M. Wells had spoken of the promoters as a foreign body coming in to take water, but the truth was, that they were within their own water-shed, and it had not been shown that there was any other better or more available source from whence a supply could be obtained. They were therefore not a foreign body, and were only doing what, after the report from the Local Government Board, they were bound to do. If they did not do it the Local Government Board, under the 9th section of the General Act, would do it, and make the promoters pay the piper. The only point upon which the two petitions were agreed was that it was proposed to take too large a water-shed, but Mr. Newton, whose character stood too high to be affected by Sir M. Wells's sneers, had given his reasons for asking for so large an area. A part of the ground might be contaminated by artificial manures, and then the Ashton Local Board would exclude that portion from their source of supply Colliery works might also produce the same effect; but, above, all the extent of gathering-ground was necessary to make good the storeage capacity. The flow of the stream upon an average of ten days during the driest possible summer weather of the driest year, from this gathering-ground, had been shown to be only 45,000 gallons a day. No doubt there was an error in Mr. Newton's figures, when he calculated that a storeage capacity of 12 million gallons would suffice. That would only give 67 days' supply, and the error in calculation was discovered by Mr. Goldsworth when he began to work out the scheme. If the promoters were only empowered to take 170 acres they would not get a sufficiency for 130 days supply for the population. They could not diminish their gathering-ground without seriously interfering with the beneficial effects of the scheme. As far as Mr. Bankes was concerned, it did not matter whether they took the water of 500 acres or 170 acres in their catch-water drains. If they did not take it, it would flow down into the brook, and he would lose it. It was said that they had no money with which to make compensation, but such a statement only needed to be made to be refuted. The estimate for the works was £20,000, but under the bill they took £25,000. There would, therefore, be £5000 to go to Mr. Bankes, if he could make out a claim to it. Besides that the local board could borrow two years income, which would amount to £100,000, the rateable value being £53,000 a year. Mr. Bankes was entitled to no greater remedy than was afforded by the general law. The opposition of the millowners was substantially that of Mr. Brewis. So far as Mr. Lee was concerned, it was a matter of sentiment more than actual damage. Sir Mordaunt Wells had said that the proposed compensation was no compensation at all. He (Mr. Mundell) quite agreed with him, for there could be no compensation where there was no injury. The promoters only wished to do what Mr. Brewis did with the water in respect of the millowners below him. He took the water into his reservoirs, used it, and sent it back into the stream again; but there was this difference, that whereas he sent it back in a putrid state, to engender fever, the promoters would send it back in a comparatively pure state for the use of the mills below. If the scheme of the bill was carried out the millowners would during the driest summer weather get one-fourth more water than they now get. From the storeage reservoir would be supplied 180,000 gallons; 20,000 gallons would return after being used into the Douglas Brook. Of the remaining 160,000 gallons a large proportion would flow back into the Down Brook. It was true that the sewage farm was contingent, but it was not remotely contingent, because the scheme had been approved by the local board and agreed to by the landowner, and only required the sanction of the Local Government

Board, which was usually given when both the authorities and the landowners were agreed. At least 100,000 gallons of the 160,000 gallons would thus flow back into the stream, which would not flow there in dry weather but for the proposed scheme. Besides that, 50,000 gallons would be given from the compensation reservoirs. At Golborne the flow was only 300,000 gallons in the driest summer weather, and the addition of the water from the sewage farm would raise it to 400,000 gallons. Of course, if the quantity was thus increased the impurity would be proportionately diminished. It was complained that the compensation would partly be given from the lower reservoirs, but if the whole of the 50,000 gallons were supplied from the upper reservoir it would be polluted by the Downall Green Colliery water and the Jack Brook. The supply would thus be equally impure, whether it came from one reservoir or the other. The water would be quite pure enough for manufacturing purposes, and, in fact, he hoped it would be purer than at present. Sir Mordaunt Wells had not proved any injury, and the promoters had not shown that their works would cause an injury: they had rather disproved any such result, and therefore no compensation must necessarily be given.

After a short consultation, the CHAIRMAN announced that the committee approved of the preamble of the bill.

The inquiry into clauses was adjourned.

THURSDAY, MARCH 11.

(Before Mr. JULIAN GOLDSMID, *Chairman; Lord* RENDLESHAM, *Mr.* E. STANHOPE, *and Mr.* G. ELLIOTT.)

BRITISH GAS COMPANY (NORWICH STATION) BILL.

Mr. MICHAEL and Mr. SIMS REEVE appeared for the promoters; and Serjeant SARGOOD and Mr. STEVENS for the Corporation of Norwich, who opposed the bill.

Mr. MICHAEL said the bill was introduced by the British Gaslight Company, and the object of it was to empower the company to enlarge their works, and to obtain further capital. The company was established by deed of settlement in 1854, for the purpose of supplying gas in various places. They had stations at Norwich, Hull, the Potteries, and two other places. Shortly after they were established, they purchased the works of the Norwich Gaslight Company. They continued to supply gas to Norwich until 1858, when, finding it necessary very largely to extend their works, they came to Parliament and obtained an Act, which received the royal assent on the 12th of July, 1858; and since that time they had worked under this Act. The enormously increased supply of gas in the city of Norwich rendered it absolutely essential, in the interests both of the manufacturers and the population, to go to Parliament in order to obtain additional powers, their powers being to some extent crippled, both in respect of the site for extending their works, and of the capital authorized by the Act of 1858. The only opposition offered was on the part of the corporation, with whom the company had always been on very friendly terms, and who, he believed, were only there to protect the interests of the town. The corporation assented to the general principle sought to be established by the bill—namely, that there was a great increase in the consumption of gas, which rendered further works and additional capital necessary. In reality, the only discussion that would arise would be as to the amount of capital, the way in which it would be raised, and as to any limitations which, in the discretion of the committee, might be put upon the extension of the works. In 1858, the date of the Act, the British Gaslight Company had expended in Norwich a sum of over £68,000. It was necessary at that time to obtain a further capital, in order to extend the works, and it was consequently raised in that year to £100,000, with the restriction that only £40,000 should receive a dividend of 10 per cent., which was the dividend accorded by the Gas-Works Clauses Act, by no special limitation; and on the remaining £60,000 the company were limited to a dividend of 7½ per cent. The limits of the Act being only to supply the city of Norwich and its immediate suburbs, the price of gas was limited to 4s. 6d. within the city, and 5s. 6d. in the suburbs; but no distinction in price had been made by the company, and all parties had been charged alike. Immediately before the introduction of the bill, which afterwards passed into an Act, the supply of the British Gaslight Company at Norwich was 74 millions in the year. Since that time an almost unparalleled increase had taken place. In 1872 the supply had trebled itself, being then 220 millions, and it had now increased beyond 230 millions. In 1872 there were about 2500 consumers, and the number had now increased to 10,000; and, to show the extent of these works, one single manufactory, which, he had no doubt, was well known to the committee—Messrs. Colman's manufactory—took a supply of 10 million feet of gas per annum. Owing to the increase of the works, and the increase of Norwich, there was a continual and steady increase in the consumption of gas. In the Act of 1858 there was a compulsory power, by which any owner or occupier could compel the company to supply them with gas, and there was a further compulsory power to lay down mains in streets and public places; therefore the company could not rest and be thankful. They were obliged, according to the requirements of the consumers of gas and of the public authorities, to be continually extending their works; and it would be found, when he came to deal with the petition, that the corporation acknowledged that state of things to exist, and that it was necessary to have further means for the supply of gas. In outlying places the maximum price had never been charged. Owing to the increase of labour, cost of coal and other materials, the price charged per 1000 was 4s. 3d., but this was subject to a large reduction in the case of large consumers, who practically paid about 3s. 6d. per 1000, while the price to the public authorities, he believed, never exceeded 2s. 8d. The illuminating power was fixed at 11 candles, that being in 1858 the standard which was put into all Acts; but, practically, as gas lighting had improved since 1858, the company had supplied gas equal in illuminating power to 14 candles. The whole of the capital of £100,000, authorized by the Act of 1858, had been expended by the company, and they were deficient not only in manufacturing power but also in storeage power.

The CHAIRMAN: Have you two works at Norwich?

Mr. MICHAEL said there were two stations, which were called respectively the Bishopgate Works and the St. Martin-at-Palace Works. By the 11th section of the Act of 1858, the company were tied from constructing works on land which was already in their possession; and, although those lands were not strictly within the section, the company now sought power, not to erect works for the manufacture of gas, but for the storeage of gas and other materials which would be necessary for the carrying on of the works efficiently.

The CHAIRMAN: The land has been purchased, then?

Mr. MICHAEL said it was in the possession of the British Gaslight Company generally, and no power was sought by the bill to acquire it. The engineers would place before the committee their reasons for thinking that the storeage power was insufficient in order properly and economically to conduct the works. According to engineers, the storeage power should always be in a certain proportion, and the company very barely attained that proportion; and if the supply of gas continued to increase, the retort power must always be increased.

The CHAIRMAN: Have you any marginal room for your retorts?

Mr. MICHAEL said that there was ample power, but their retorts were not in action. The company were strictly prohibited by the Act from putting in retorts upon the lands he had referred to, and there was nothing that would result that could be complained of in any way by the owners of property, in the use by the company of those lands for the storeage of gas. By the Act of 1858 the company were expressly limited to £100,000. Power was sought by the present bill to extend the capital to a further sum of £100,000; and, looking to the increase in the consumption of gas within the last 15 years, in 10 years time it might be fairly expected that a very large proportion, if not the whole, of that £100,000 would be found to be necessary. The only other power sought by the bill was the power of allocating a sum for general expenses, and the conduct of the station, in excess of the power granted by the Act of 1858—namely, to raise the sum from £600 to £1000. The three powers sought by the bill were—first, to erect additional storeage works upon the ground required by the company; secondly, to increase the capital by another £100,000; and thirdly, to allocate a fair share of the expenses of central management to the undertaking at Norwich, and to raise that sum from £600 to £1000. In the original draft of the bill 7½ per cent. dividend had been put in on the largest portion of the capital—namely, £60,000; but in deference to the expressed wish of the corporation, and in order to avoid, if possible, any opposition from them, the promoters had limited the amount of dividend on the additional capital to 7 per cent., as would be found by reference to the 9th clause. What was asked by the 6th clause, he ventured to say, was entirely exceptional in a petition, and he expressed his surprise that a public body, having the trust of public interests, would venture to ask Parliament to insist upon such a confiscation of property as they desired by that clause of their petition.

Serjeant SARGOOD said the bill had been altered since the petition was lodged, and that the clause would be withdrawn.

Mr. MICHAEL said the company also sought for power to raise further capital on shares not exceeding the sum of £100,000, and to take thereon a dividend of 7 per cent., and he believed he was correct in stating that no bill had passed the Houses of Parliament in which a smaller sum than 7 per cent. had been asked, except under peculiar circumstances. The petitioners alleged that, although further capital might be required for the more efficiently carrying on and extending of the present works, a further capital was not now, and could not for many years be needed, and that it was bad in principle, and might involve a heavy tax upon the consumers to raise more capital than could reasonably be expected to be required for a limited number of years. That was an allegation that was continually met with in petitions by public bodies against the raising of capital. He waited to hear from his learned friend his argument in support of that allegation, for it presumed that a trading company was so absurd in the conduct of its affairs as to expend capital upon works which were not to be productive, for the mere purpose of spending it, knowing that such money would not bring in the dividend with was limited by the Act. He had never heard the argument, why companies should so depart from the ordinary rules of business as to waste their money in an undertaking of this character. All that was necessary on his part, was to point out to the committee that such an argument had never been established before a committee of that House—that the granting of powers within the moderate rules of compensation to raise additional capital had never yet led to any injury to the public.

The CHAIRMAN: There is no allegation in the petition that the capital has been improperly expended.

Mr. MICHAEL: No; nor was there any allegation that the work had been carried on in any way unfavourable to the inhabitants of Norwich. The corporation alleged nothing against the mode of supply or the price, and the promoters were seeking to put themselves under restrictions and compulsion as to a better supply, raising the quality from 11 candles, which they were now bound to supply, to 14 candles, which was now made compulsory under the bill. The petitioners further submitted that, inasmuch as the company had a monopoly of the supply to the district, and the works were now of a permanent character, the consumers should not be taxed with a dividend of so high a rate as 7½ per cent. upon an additional capital, and that the necessary additional capital could be obtained at 5 per cent. on debenture stock. That was entirely a new doctrine, and entirely opposed to general legislation. The general law was that, before any money should be borrowed, there should be a security on the part of the borrower and of the public that the capital of persons undertaking various works of this kind should be invested. It surrounded the borrowers of money with formalities by which the company were obliged to prove before a justice that they had expended the sum of money out of the pockets of the shareholders which was prescribed by the Act, before they were entitled to borrow any money for the purpose of extending their works. The rule generally was to borrow one-fourth of the amount of capital; that is to say, suppose the capital was £1000, then the borrowing power would be £250; and it must be proved that the money had been actually expended on the works up to the present time. Whatever might have been the wish of the company to borrow money, they had been absolutely restricted under the limits he had mentioned; and any person attempting to introduce a clause to borrow a higher amount would find that a supreme authority, which regulated bills of this character, would strike out such a provision, and would restrict the limit to one-fourth of the capital. He should wait for his learned friend to point out by what arguments the corporation of Norwich sought to set aside general legislation. The petitioners also submitted that 14 candles was too low a standard.

Serjeant SARGOOD: I will relieve you of that; we sought 15 candles, but will now be content with 14.

The CHAIRMAN: Then we will strike out clause 11.

Mr. MICHAEL: The petitioners further alleged that in the manufacture of gas and coke a great nuisance had been created, and from the impure quality of the gas supplied for some time past the inhabitants of Norwich had suffered in health; that the proportion of sulphur in 100 cubic feet of gas had gradually increased from 15 to 50 grains, that the proportion of ammonia had also increased, and that the provisions in the bill were insufficient for sanitary purposes. With regard to the question of nuisance, if any nuisance had arisen, there was statutory authority sufficient to prevent it. There were heavy penalties and continuing penalties which might be enforced by the local authorities; and, therefore, this reproach on the part of the petitioners rather reflected back upon themselves.

The CHAIRMAN: What was the limit as to the amount of impurity under the Act of 1858?

Mr. MICHAEL said there was no limit; in fact, at that time, pressure, purity, and all the various matters which were now inserted in gas bills, were not thought of. Chemistry at that time had not made such progress as to enable any fixed method to be determined by which the quantity should be limited.

The CHAIRMAN: That is open to dispute.

Mr. MICHAEL said, however that might be, there was no limit fixed at that period. The petitioners held that the gas should not exhibit any trace of sulphuretted hydrogen mentioned in the schedule attached to the regulations in Part I. of the Gas-Works Clauses Act, 1871. The corporation had power to appoint an analyst, in order to test the quality of the gas, and the promoters proposed to allow the test by analyses mentioned in that Act. The petitioners said the gas should not contain more than 30 grains of sulphur in every 100 cubic feet of gas, or 5 grains of ammonia.

Serjeant SARGOOD: That is a new clause since the petition was lodged, and we are ready to say—content.

Mr. MICHAEL: The petition further alleged that from the works a fluid flowed into the river, whereby it was rendered foul and offensive, and unfit for domestic use and otherwise. He would again say, in answer to this, that the very heaviest penalties were inflicted by sanitary legislation upon offences of this character. A penalty of £50 per day was inflicted upon gas work owners or others who fouled water in the way that had been described, but he begged to deny explicitly that any nuisance complained of had been created; and even if there had been, the corporation could have had their remedy. The public were also sufficiently protected by the general law, and, under such circum-

stances, it was a work of supererogation to put in such clauses, because, if the present law was inoperative, no specifice clause inserted in a bill could have any greater power. The petitioners also asked that power should be given to them to purchase the works by agreement on any terms that Parliament might think reasonable. No onus was ever thrown upon the sanitary authorities to supply gas. Power was conferred upon them to supply water, but in respect of the supply of gas, the only power was that they might contract with any one who would undertake to supply gas for three years in their district. The corporation said that they ought to be the persons to supply gas. If they ought to be, the promoters were willing, when the proper time came, and under proper circumstances, to hand them over the works; but they were not prepared to depart from general principles of legislation, and to have a clause put in by which the corporation, at their own will, could be possessed of the gas-works belonging to the company; and he was sure that the committee would not depart from the uniform rule observed in Parliament—that it should not be made compulsory for any gas company to part with its works. It had been admitted in many cases—and the learned referee knew that Parliament had frequently refused power to local authorities to possess themselves of the works against the will of the company. He had almost overlooked one matter, and that was the increase from £600 to £1000. Evidence would be given to show that the rateable proportion charged would be extremely small in proportion to the undertaking. He should be prepared to give evidence that the works were conducted in an exceptionally good manner, and would challenge comparison with any gas-works in the country. It would be found that the amount of capital expended upon these works was only one half of the money expended upon works throughout the country, that the sum of money required for the dividend upon the capital was only 9d. upon the price, and that the whole of the conduct of the works would bear comparison in figures, both in the manufacture and distribution of gas, and in the expenses incident on the management with any other gas company. Under the circumstances, having established, even by the petition of the corporation; first that it was essential that there should be increased facilities given to the company. He thought he should be able to satisfy the committee that what the company proposed to do would injure no person, but would benefit both the corporation and the consumers, that the proportion of the capital proposed to be expended in the making of tanks, and various alterations in the works, was essentially needed to supply gas; and he appealed most confidently to the success of the past as a guarantee that in future the capital would be spent in such an economical way as to give an increase of gas without any additional burden to the consumer. Having proved this, he thought he would be justified in asking the committee to pass the preamble of the bill.

Mr. *Frederick Linging*, examined by Mr. SIMS REEVE.

I am secretary to the British Gaslight Company, and have held that office since 1859. The company were established in 1824, and incorporated Oct. 1, 1857, with a capital of £300,000, in 15,000 shares of £20 each; 12,000 shares have been issued, and £240,000 raised, leaving 3000 shares to issue, and £60,000 capital to be raised. We have also power to borrow £50,000 by debenture, making £110,000 capital not raised. The shareholders have power, at a special general meeting, to raise additional share capital. The company has no bonded debt. It has five working stations, one at Hull, one at Norwich, one at the Potteries, one at Trowbridge, in Wiltshire, and another at Holywell, in Flintshire. The stations at Hull, Norwich, and the Potteries are worked under parliamentary powers obtained in 1858. The capital laid out at the Norwich station is £100,000. On £40,000 of that sum, the company has power to pay 10 per cent., and on £60,000, 7½ per cent. The whole of the £100,000 has been laid out in plant and mains. We have not realized the whole of the parliamentary interest allowed to us by the Act of 1858. We have not realized the interest upon the capital by £505. We are entitled under the Act of 1858 to a neither realized our interest on the capital invested, nor have we a reserve-fund, reserve-fund which, upon our share capital, would give us £10,000. We have which we ought to have. The maximum price of gas under the Act of 1858 is 4s. 6d. per 1000, and 5s. 6d. in the suburbs. We have made no distinction in charge to the consumers supplied in the city and those in the suburbs, nor have we charged the maximum price of 4s. 6d. authorized by the Act. We have allowed 15 per cent. to large consumers. The highest price has only been 4s. 3d. since Michaelmas last. We did not raise the price of gas when the price of coal rose two years ago. We made a loss of £1452 8s. 3d. for the six months ending June, 1874. In the Michaelmas quarter following we raised the price from 3s. 9d. to 4s. 3d. We supplied the whole of the public lamps at Norwich. We have never exceeded 2s. 8d. per 1000, and the minimum charge has been 2s. 6d. I think they are all full lights. At the present time there are 1100 public lamps lighted by the company. In 1858 there were only 800. The accounts at the Norwich station are kept separately and distinct from those of all the other stations. They are audited by an auditor appointed by the Local Board of Norwich, and paid by us under the Act. The accounts have been audited by Mr. Richardson, from Dec., 1858, to the present date. Mr. Sutton is the chemical adviser of the corporation. A photometer has been put up at his place to test the quality of the gas. The corporation refused to pay him, and he is paid by the company. He makes a report monthly to the corporation. There is no inspector. In 1858 the private and public rental was £16,337, and the gas sent out was 79 million feet. The leakage is between 8 or 9 per cent. The gross rental ending Dec. 30, 1874, was £41,834, and the amount of gas sold was 230 millions. The city and suburbs of Norwich are largely increasing, as are also the requirements for gas. It is absolutely necessary we should have additional capital to carry out the improvements required by the Act of 1858. We should require £100,000 additional capital, which I do not think would be too much. Within the next two years £30,000 will, at all events, be absolutely necessary. The works have increased since 1858, which entailed an increase in the chief office expenses, which in 1858 were £1825. They are now £3053. In 1858 the Norwich branch contributed £600, which is all they contribute now. The cost of management per 1000 feet for Norwich is ·62d.; Hull, 1·17d.; Potteries, 1·45d.; Trowbridge, 2·14d. Upon a capital of £100,000, Norwich is charged £600; Hull, £1217, on a capital of £90,000; the Potteries, £766, upon a capital of £53,000; Trowbridge, £274, upon a capital of £19,000; and Holywell, £132, upon a capital of £9300. That is on the capital expended. In the year ending Dec. 31, 1858, we allowed discount to the large consumers to the amount of £149. In the year ending Dec. 31, 1874, it amounted to £1241 7s. 6d.

Cross-examined by Serjeant SARGOOD: To all intents and purposes we are a joint-stock company. The capital authorized under the deed was £300,000. We should not require an Act of Parliament to raise another £100,000. The shareholders could agree to do it among themselves, if it was found necessary. The borrowing power is given under the articles of association. It is agreed among ourselves that we will not exceed the borrowing powers of £50,000.

A MEMBER of COMMITTEE: You agree among yourselves that you will not raise more than £300,000 capital, and that you will not borrow more than £50,000 under the special Act?

Witness: Yes.

Serjeant SARGOOD: Therefore it is more a limitation to the power of borrowing than conferring a power of borrowing. That would be more strictly what it means.

Witness: I think so.

Serjeant SARGOOD: Supposing the borrowing power of £50,000 should not be enough, would you hold some sort of meeting if you wanted to borrow £100,000?

Witness: I do not know that we should.

Serjeant SARGOOD: The amount of capital you choose to raise, and the settlement of the amount of money you choose to borrow, is settled among yourselves, and you do not require a special Act of Parliament to authorize it?

Witness: No.

Serjeant SARGOOD: The peculiarity of your Act of Parliament is that you require authority to spend a certain sum of money, and not to raise it?

Witness: Yes.

Serjeant SARGOOD: If you want to secure a statutory 7 per cent. dividend, it must be on a fixed amount of money—on such amount as you can show to Parliament is necessary to be spent on the particular part of the industry you pursue?

Witness: Just so.

Serjeant SARGOOD: And, therefore, in Norwich you have an Act of Parliament, not to entitle you to raise £100,000 for the purposes of Norwich, but, out of a sum of £300,000—if you have got it—to spend £100,000?

Witness: Yes.

Serjeant SARGOOD: Then you are not like ordinary companies under an Act of Parliament asking power to raise capital, embarrassed with a clause that you can only raise a proportionate amount of borrowed money?

Witness: No.

Serjeant SARGOOD: And you are also entitled to say this—that all the capital you get power to apply to Norwich shall have interest attached to a share, and that you are not bound to borrow any money at all, and have no power, under an Act of Parliament, to borrow for the borough of Norwich.

Witness: The parent company, as I take it, find the money. The five stations I have mentioned are the only five stations which our company is managing, and we have never had any more. With regard to the first three, we have parliamentary powers in applying the capital. In 1857 the directors of the British Gas Company wished to be constituted as a company, but there was an objection taken to it, I believe, by Lord Redesdale. He would not allow any company so constituted to have a roving commission. I believe the reply of our company was that we did not want a roving commission—that we had five stations, and never had any more. His reply was, "I do not care for that. You are now under a deed of settlement, and you must come under the Limited Liability Act, and you must seek powers in Parliament for the protection of your stations." In accordance with those instructions, in 1858 we sought powers for three of our large stations, Trowbridge and Holywell being so small that they were not worth the trouble of going to the expense of asking powers for, and, as we felt confidence in ourselves that we could be on the best possible terms with the authorities of Trowbridge and Holywell, we did not seek parliamentary powers for those stations, and we have not done so, and we continue on the same footing as we did. I had an interview with Lord Redesdale, and he made a similar remark, saying, "Why do not you seek incorporation?" I called his lordship's attention to what he said in 1858, but he could not recollect it, and that is the reason why the British Gaslight Company is in the position it now is, not by its own wish; it was forced to become a limited company, seeking limited powers at the various stations. The returns of the capital are the same at Hull as at Norwich, except at Hull we get 10 per cent. upon upwards of £50,000. At the Potteries we get from £35,000 10 per cent., and on the remainder, up to £60,000, we get the same return as at Norwich—namely, 7½. At Holywell we do not make any profit at all. It is a small station, and very expensive to work, and it has never been a paying place. We were induced to go there because it was supposed it would become a second Liverpool.

Serjeant SARGOOD: Then you are obliged to draw upon the profits at Norwich and elsewhere to compensate for the loss?

Witness: Oh, no. The shareholders pay that.

Serjeant SARGOOD: Is the whole of the £240,000 expended in divers ways and places?

Witness: Yes; and is held by shareholders. We have not raised any of the £50,000. We have no deed. We have power at present by a meeting to raise £50,000 if we thought fit. There was an attempt made some time ago to raise money at 5 per cent., but we did not succeed. The borrowing powers at present have never been used. All we have raised on capital has been either by shares or loan.

Serjeant SARGOOD: But you tell us you have spent upon these five stations £270,000 of capital. Where is the other £30,000 to come from?

Witness: Out of the pockets of the shareholders. The British Company for a great number of years were, like many companies, liable to mistakes, and they were forced into getting money from the shareholders to invest at the stations. They had to deprive the shareholders of the dividend due to them, and invest it as capital.

Serjeant SARGOOD: Then that is accumulating profits?

Witness: That is capitalized profits.

Serjeant SARGOOD: If £240,000 is all the capital that is really raised, and the other £30,000 is surplus profit spent upon the concern, do you declare your dividend only on the £240,000 capital, or on the £270,000 capital?

Witness: Upon the £240,000, of course. I consider that the £100,000 additional capital is what we want. There is a large amount to be laid out for purification, &c., during the next two years, and I am of opinion that £30,000 will have to be laid out altogether. The dividend paid at Norwich is 6¾ per cent., on an average, upon the 7½ per cent. capital. The parent company has paid the 10 per cent. The parent company finds the capital, and therefore is the company that pays the dividend irrespective of the stations. If they cannot draw enough from the stations to pay the 10 per cent. dividend, it necesarily follows the shareholders cannot get it.

Serjeant SARGOOD: But, supposing the amalgamated stations do pay, they do get it?

Witness: Certainly.

Serjeant SARGOOD: And if one of the separate stations pays more, and the other less, the amalgamation might be able to supply it?

Witness: Of course it comes out of the general profits of the concern?

Serjeant SARGOOD: So that, after all this sort of allocation at Norwich, and this payment of dividend of 7 per cent., there are no ear-marked shares attached to Norwich capital, which, if subscribed at 7 per cent., would be entitled to receive the 7 per cent.?

Witness: That is so.

Serjeant SARGOOD: After all, it is the amalgamated company which decide how much dividend you are to get, and not the Act of Parliament?

Witness: Of course the company themselves decide, because it is the company which supply the capital. We added to the reserve-fund in Norwich for a short time about £3000, which went to pay back dividends. We did not raise the price of gas as we should have done, and we did not get our parliamentary powers, and we had to fall back upon the reserve-fund. The 7 per cent. and 10 per cent. we talked of at Norwich is inapplicable to any ear-marked shares at all.

Serjeant SARGOOD: You cannot hand over the 10 per cent. to your shareholders, and say it came from Norwich?

Witness: Decidedly not. For the last year the parent company has paid its shareholders 10 per cent. on the whole capital. We are supplying the suburbs within the corporation district. We are not entitled to 4s. 6d. within the corporation district, although there are some suburbs within the corporation district we only charge 4s. 6d. We have supplied gas outside the corporation district, but it is a very small proportion in regard to Norwich.

Serjeant SARGOOD: Not a sufficient price to make it worth while?

Witness: Just so.

Serjeant SARGOOD: I was only anxious that, virtuous as you may seem, you should not assume a virtue you had not.

Witness (continuing): The book-keeping of each station is kept in London at the chief offices, and the returns of all the stations are sent up monthly, but each station is kept separate. The accounts sent up are very elaborate. The directors fees and auditors fees are voted by the shareholders. We simply fairly endeavour to assess Norwich with its proper quota, having regard to the proper amount of capital and labour that is given to the city.

Serjeant SARGOOD: If you are pitching impurities into the river, what remedy have we against you?

Witness: The 21st section of the Gas Clauses Act provides for that. For fouling, there is a full penalty of £200.

Serjeant SARGOOD: Who is to take action against the company if the corporation are not the owners of the river?

Witness: It is a matter for arrangement between the parties to whom the water belongs as to whether the corporation should take upon itself the cost of proceeding against the company.

The CHAIRMAN: You are asking, serjeant, who are the conservators of the river?

Serjeant SARGOOD: I am asking whether the local board can call the river "their water," so as to enable them to proceed.

The CHAIRMAN said the witness was being asked a question which he, not being a lawyer, could not answer.

Serjeant SARGOOD (to the witness): Are you in a position to say whether the company would part with the works at a fair price to the corporation?

Witness : I am not.

Serjeant SARGOOD: If we brought in a bill to acquire possession, would you oppose it?

The CHAIRMAN: That is going rather beyond the clauses of the bill and your petition. I do not think you can have that question answered.

After a short discussion between the learned counsel as to the land proposed to be taken for storeage,

The CHAIRMAN said: Practically, the only way in which you can bring in the question of the land would be to prove, if possible, that the storeage of gas would produce upon this land a great nuisance, and cause, possibly, a fouling of the water.

Mr. MICHAEL: In the first place, the Act of 1871 applies to undertakings authorized under that Act, but where you have a roving commission to take land for the undertaking, you are not to take that land unless you have the consent of the inhabitants; where lands are scheduled to the Act it is not necessary to have that consent.

Serjeant SARGOOD: We think it bad that the company should obtain absolute power, without the consent of anybody, to store gas in that particular place, and it ought to be guarded by a clause to provide that the neighbours should not be injured.

Re-examined by Mr. MICHAEL: We are obliged, by the Act of 1858, to keep a separate account of the whole of our works in the city of Norwich, as though, we were a separate undertaking established at Norwich for the supply of gas; and a public accountant examines our accounts from time to time, and certifies them to the local board. Abstractly considered, the sum for management at Norwich is not a large one, as compared with other gas companies. About 12 months ago we had surplus profits, and they were invested in a reserve-fund. In order to avoid raising the price of gas to the people of Norwich, we expended money from that reserve-fund; if we had not done so, we must have increased our price to the maximum. It is likely that, after spending £30,000, we shall require to spend further sums in the course of seven or eight years. Our object is not to come every year to Parliament.

By the COMMITTEE: We do not make more than 10 per cent. on a portion of our capital, and 7½ on the remainder. That per centage is charged on the respective amounts; it does not affect the amounts received by the shareholders.

Mr. *C. Tadman*, examined by Mr. MICHAEL.

I am the superintendent of the gas-works at Norwich. I have been superintendent for 14 years. Previous to that I assisted my father, who was superintendent for 36 years. The supply of gas has trebled itself in 14 years. It was 230 millions last year. There is a continual increase in the number of public lamps and the consumption of gas. I agree with the secretary that £37,000 will be required; we require £20,000 for this year, and further sums will be required in following years. No nuisance can arise from the storeage of gas at the places indicated.

By the CHAIRMAN: We do not propose to put a new gasholder at the works near the cathedral. The land there is wanted more for coal stores. We propose to remove the stores from the old land to the new, and place the gasholder on the old land. The works do not cause any nuisance to the river; no gas washings or anything of that kind are allowed to run into it. We do not allow water to escape from the tanks, nor gas from the holders; it would be a great waste and loss to do so, and it is not possible for a nuisance to arise in any other way. We use lime and oxide in combination as a means of purification; that is the only possible mode.

Cross-examined by Serjeant SARGOOD: If water did escape from the tanks it would be a very filthy sort of stuff. The water that runs over the tanks when they become surcharged is not filthy. There is an overflow-pipe to carry it away; it then passes into a surface drain and thence into the river. The gasholder travels up and down in the area of the tank, but that does not pollute the water in the tank. We do not propose to have any gasholder on the new land at St. Martin's Palace. We require £20,000 to be spent at once; of that sum £3500 will be required for the new land; £6000 for a new gasholder; £4000 for new purifiers; £1000 for the alteration of existing purifiers; £2000 for the enlargement of mains; and £850 for a coal-shed. The works thus enlarged would do what is required for the next ten years; then more money will be required for additional gasholders. We shall want another £20,000 at the end of ten years from this time. The fact is, as the consumption increases, everything connected with the gas-works goes on increasing. I have said nothing about the money required for retorts. I should like to spend the whole of the £100,000 in the next ten years; that would of necessity indicate a very great increase in the consumption of gas, and that is what I want to see. The £4000 is wanted at Bishopsbridge, that is for new purifiers. No complaint has been made there.

Re-examined by Mr. MICHAEL: The amounts I have named, as required, have nothing to do with the manufacture of the gas. Mains have been laid down in connexion with the purifiers, so that any chance of nuisance is reduced to a minimum. The purifiers are so managed as to avoid any smell. There is no occasion for any complaint as to nuisance. I do not think that any nuisance will arise from what is proposed to be done.

Dr. *Letheby*, examined by Mr. MICHAEL.

I am professor of chemistry at the London Hospital. I have had great experience in testing gas. I was invited to test these works in May, 1866, to see if any nuisance was created. It was said that the works injuriously affected the vegetation in the neighbourhood, but that I found not to be so. There were complaints of smells arising from the works. There always is some little smell from works of that kind. Smoke was seen to be issuing from the retort-houses. I suggested certain alterations, which were made, and the smoke abated. I visited the works again on Monday last. I found them to be very well conducted indeed; there was a lack of room, but as regards manufacture they were conducted with great care and attention. I do not think any injury arises to the health of the inhabitants from the proximity of the works. The trees in the neighbourhood look pretty much as they did 10 years ago. Water from the heavens falling on to the top of the gasholders, and then into the tanks, and discharging itself into the sewer, would not create a nuisance. I do not know of any other nuisance that could arise from the storeage of gas.

Cross-examined by Serjeant SARGOOD: As the company sent for me in 1866, I prescribed the best remedy I could for them. I advised the company to quench the coke with water in the retort-houses, rather than in the open air; and that they should convey the steam into the chimney-shaft to carry off the noxious fumes. When I visited the works last Monday they were not doing so; they were roughly quenching the coke in the retort-houses, but they were continuing the cleaning on the outside, and not carrying the vapour into the chimney-shaft. I did not remind them of what I had advised on my previous visit; I did not remember my previous report. On my first visit I recommended that the lime used in the purification of the gas should be placed after the oxide; but I should now recommend them to place the lime first. The proper place for the lime is before the oxide, and they are doing so now. My visit last Monday was not because of complaints, but to ascertain whether the works were being properly conducted.

By the CHAIRMAN: I recommended the catch-box system.

Re-examined by Mr. MICHAEL: I gave them notice of my going down, but they could not possibly have deceived me.

By the COMMITTEE: If another gasholder is added to the St. Martin's Palace works, and the necessary retorts and works are placed there, it will diminish rather than increase any chance of nuisance. They are now working at great disadvantage, and under considerable difficulty, their storeage-ground being so confined. If that were increased, and another holder erected, there would be much less chance of a nuisance.

By the CHAIRMAN: They work now at great disadvantage because the gas is carried too quickly through the retorts.

Mr. *Francis Sutton*, examined by Mr. REEVE.

I am public analyst for the county of Norfolk. In May, 1865, I was appointed by the directors of the British Gaslight Company, to examine periodically their gas. To do so, an apparatus was fixed, at the expense of the company, in my laboratory. I undertook to make two photometric examinations of the gas every week, to see what quantity of sulphur and what quantity of ammonia it contained. I was paid a salary of £60 a year by the company for so doing. Shortly after my appointment by the company, I was appointed by the Norwich Local Board of Health to examine for them. They knew of my appointment by the company. I have examined the gas from the time of my appointment until now, and have made periodical reports. I have tested the illuminating power of the gas; the average since 1868 has been 14 candles. It has always been above the standard. During the last year the average quantity of sulphur has been 23 grains in every 100 cubic feet of gas. I know the way in which the gas is purified, and how the lime that is used is removed, and I cannot suggest any better way of removing it than the present. I think everything is done that can be done to prevent nuisance.

Cross-examined by Mr. STEVENS: In 1866 there were not more than 16 or 17 grains of sulphur; in 1873 there were 53 grains. We are improving the average of light, although the average of sulphur is worse. As to ammonia, in the second year of my examination it was one grain, but it has not been so much as that for the last six years.

By the CHAIRMAN: I think washers are better than scrubbers.

Cross-examination continued: Considering the difficulties the company have had with the coal, the quantity of sulphur has been kept down. The company has lately been burning an inferior coal. My observations are taken in my own laboratory. I am also frequently at the works of the company. The refuse lime is carted away.

Re-examined by Mr. MICHAEL: The quantity of sulphur we get rid of depends on the kind of coal used. I am not aware of any nuisance created by the conduct of the works, further than is inseparable from gas-works. It has not been conducted so as injuriously to affect the health of the inhabitants.

By the CHAIRMAN: A coal which is better for illuminating power contains more sulphur. It is to the interest of every company to save all the ammonia they can. It is a greater nuisance than sulphur. It is less easily dispersed. The average of ammonia is much lower than in any other company.

Mr. *G. W. Stevenson*, examined by Mr. MICHAEL.

I am a gas engineer. I have examined the gas-works at Norwich, which are exceedingly well designed and substantially constructed. At the time of my visit the management was being conducted in the most modern and approved way. I went down with only one day's notice. In my opinion it is necessary to have an enlargement of the works, in order to increase the supply of gas to the city of Norwich. It is necessary that there should be an enlargement of the ground for storeage. The works are extremely well conducted, and so as to occasion as little nuisance as possible. Rain water getting into a tank, and so into the sewer, and then into the river, would certainly not create a nuisance. No nuisance can arise on any land from the storeage of gas. I do not know of any other source of nuisance except the escape of gas from the tank or holder. With ordinary care no escape can arise. It would be ruinous to the company to have leaky gasholders. The works are very cleanly kept, and everything is well managed.

Cross-examined by Mr. REEVE: I have examined the accounts. I do not think it excessive to ask for £100,000; we may fairly assume that in eleven years the business will be doubled; the capital will not be increased exactly in the ratio of the business, but it may be fairly assumed that the capital now asked for will be exhausted in 15 or 16 years. There certainly would not be any temptation to the company to spend money beyond the requirements of the district. The average leakage is 9 per cent. That is very low.

By the CHAIRMAN: I think the capital has been providently expended.

Re-examined by Mr. MICHAEL: I do not know a company with a capital so low that does the business which this company does.

By the CHAIRMAN: I think that both scrubbers and washers should be used. For purifying I use lime, then oxide, and then lime again.

Mr. *John B. Pitt*, examined by Mr. MICHAEL.

I am a medical man, and have practised in Norwich for many years. I am medical officer for the district of St. Martin's, in which the Palace works are. I have filled that office for 20 years. There are a considerable number of poor people in the district, which I consider healthy as compared with others. I have never known of a nuisance arising from the gas-works.

Dr. *Bateman*, examined by Mr. MICHAEL.

I am a physician practising in Norwich. I have resided there all my life. I am a shareholder in this company. I am connected with the district in which the works are. As a practical physician, I can say I never had occasion to attend any case of illness which was caused by these works. I do not think any nuisance arises there from the existence of the works.

Mr. *A. Penny*, examined by Mr. MICHAEL.

I am a gas engineer, and have had great experience in the conduct of gas-works for the last 28 years. I visited the gas-works and saw the operation of cleaning out the purifiers. That is the most difficult part in the conduct of a gas work, and is the most likely to create a nuisance. It is that particular work that creates a nuisance. I knew that that would be the particular point insisted on in this case; I paid particular attention to it, and I say no nuisance was created by the cleaning of those purifiers; care was taken to prevent any noxious matter from escaping. I never knew of any works which were better conducted.

Mr. *W. Haywood*, examined by Mr. REEVE.

I am the engineer to the City of London. I have visited these works. I have had occasion to visit a great number of gas-works, and I found these works in as good and clean a condition as any works I ever saw in my life. I paid particular attention to the mode in which the surface water is carried from the works into the river. Supposing a sewer were constructed by the corporation there would be no difficulty in conducting water from the works by a main into that sewer. The town has a very extensive system of sewers with an outfall 2 or 3 miles out of the town. If a sewer were to be driven to the river, all chance of pollution must cease. When water falls on to the purifiers some tarry matter might in that way run into the river and make a great display, but the quantity must be so infinitesimally small that you could not call it a nuisance. As a practical man I found no chance of any nuisance arising from the works.

Cross-examined by Serjeant SARGOOD: I went down expressly to form an opinion as to the nuisance. I was retained by Mr. Stevenson as a witness. I visited the works last Monday and Tuesday. I was not consulted before the bill was lodged.

Mr. *George Orris*, examined by Mr. REEVE.

I am a collector of rates, living in Tabernacle Street, near the British Gas Palace works. The distance from my house to their station is about 50 yards. I have lived six years in the house which I now occupy. Before living there, I lived for eleven years in the adjoining parish, about 150 yards from the works. During those 17 years neither I nor my family have ever suffered from any nuisance arising from the gas-works. I have been collector of rates in this district for nearly seven years, and am well acquainted with the neighbourhood. It is very healthy. If there were any great complaints, I should have heard of them. I have heard of none at all.

FRIDAY, MARCH 12.

In answer to a member of the committee,

Mr. REEVE said that, under the Act, the accounts were submitted to an auditor appointed by the Norwich Local Board of Health. As soon as the 10 per cent. was exceeded, then it would be for the Norwich Corporation to step in and say, "We ask to have the surplus handed to us." The provision was in the Gas-Works Clauses Act, and was provided for in sections 6 and 16.

Serjeant SARGOOD, addresing the committee, said he had been endeavouring, with the assistance of his learned friend, Mr. Stephens, to win now the case. The Corporation of Norwich, he need hardly say, had not come there with any feeling of antagonism against the company, and had not attempted to set up any complaints against them, or to make out that they were not conducting their business fairly. In the interest of the public, whom they represented, the corporation had felt it essentially their bounden duty to institute the inquiry, and to bring under the notice of the committee one or two points in reference to the position in which the public were placed, and in which the corporation would be placed by and by. They were anxious to have the opinion of the committee as to the course which ought to be taken. With regard to the important question of nuisance, they all knew that gas-works could not be carried on without a very considerable amount of local annoyance. That was the case not only with gas-works, but with other institutions of a similar character, the inconvenience arising from which might not be detrimental to health, although of course it must be submitted to. One could not expect, in the neighbourhood of gas-works, to be so agreeably treated as when passing M. Rimmel's shop in the Strand. As, therefore, he could not go into the question of nuisance in the shape of annoyance, inasmuch as there was a legal remedy for the corporation in the various Acts of Parliament, he would not weary the committee by dwelling on that point. As far as that applied to the river, he was quite aware of the difficulty he laboured under there, the pollution of rivers being a very large question, and one in reference to which public legislation must sooner or later take place. He therefore felt, after what had been said, that legislation on that subject at Norwich was hardly the thing which the committee could be expected to recommend. It was not, however, to be assumed that, whatever the annoyance might be, the corporation had all the remedies at command which Mr. Michael would lead the committee to believe. With regard to the storeage of gas, where gas is stored there must be a certain amount of danger. As to the tank and the gasholder, as a matter of fact the overflow from the tank of water impregnated by gas running into the sewers, and then into the river, was a substantial annoyance from which some of the people of Norwich were suffering. Having, however, said that, he would not press the question of annoyance; he would not go farther, although it was well known that in the conveyance of gas for ordinary domestic consumption, through water, there was a deposition from the gas which made the water very offensive. The committee, he thought, might find it convenient to give an intimation as to certain principles, and might possibly consent to some clauses to facilitate the acquisition of the gas-works by the corporation. Honourable members were now so familiar with the acquisition of gas and water companies by corporations in the interest of the public, that nothing more need be said upon that. But he would ask the committee to say that there should be inserted in gas bills some clause which would enable a corporation, if so minded, to purchase at a fair price, and give them the power to come to Parliament for a bill to facilitate the purchase, and prevent the company from opposing that proceeding. How far the committee might think it convenient, or otherwise, to intimate such an opinion, it was not for him to say; but the corporation of Norwich would be very glad to have, by means of that opinion, anything that would facilitate the movement for acquiring these works for the benefit of the public. Then came the more practical and serious consideration of the financial part of this question, as introduced by the company. This was not a bill promoted by the company for the privilege, by means of parliamentary powers, of raising capital. In so far as the proposition about capital stood, the committee would, he thought, agree that the case was somewhat unique. The ordinary course of a public company was to come to Parliament for power to raise capital, whether by means of ordinary or preference shares, or by means of borrowing powers, as supplemental to existing shares; and the borrowing powers were generally one-third of the authorized capital. The company, therefore, stood in the peculiarly unique position of not being required to come to Parliament for any authority to raise capital. Their capital was nominally £300,000, and they might make that £3,000,000 if they liked. They had associated themselves together in the City of London, and they had agreed that their capital should be £300,000; they might, by regulations of their own, in their own private room, at a subsequent meeting, decide that their capital should be £3,000,000, and the committee could have nothing to say to that. They had also agreed that the corporation might borrow £50,000, but they might meet and agree to borrow £5,000,000 if they chose, or even £50,000,000. They were devoid of all parliamentary control whatever. The committee might naturally say what did they come for? They might, if they pleased, spend £50,000 more at Norwich than they had spent in improving their works and increasing their trade. They had no need to ask the leave of the committee at all for anything of that kind. What, then, did they come there for? They came there to ask the sanction of the committee to take 7 per cent. for the use of their capital, in consequence of what they would suffer if they attempted to do so in any other way. They could not walk into Norwich, and carry on their trade without laying pipes and taking up the streets, and for that they wanted parliamentary power; and when they came to Parliament for power to carry on their trade they had meeting them the Gas-Works Clauses Act, to which they were obliged to make themselves subservient. Then came the question of a limited dividend. So that what the promoters asked for was, not for leave to raise money by shares, or borrowing powers, or for leave to spend it, but for leave to put it out in a particular channel, and get the committee's sanction for a return of 7 or 7½ per cent. That was a position singularly unique. This looked as if the committee had to deal only with a portion of the company. The company itself eluded the grasp of the committee. It was something like that interesting animal, the octopus, whose body was singularly large, and was supposed to be lodged in London, but whose feelers were so elastic and long, that it could spread itself out to Norwich in order to grasp its prey. It sent out its feelers to Hull, to Norwich, and other places, to get a larger per centage for its money. By what clever mode of manipulation the thing was done he could not tell, but for years past the company, whose body was in London, while its claws were in Norwich and elsewhere, had been doing this. It divided 10 per cent. among its shareholders; and the chairman, with his readiness and aptitude for seeing at once the bearing of the figures, was kind enough to suggest that the company had a large amount of capital in use which was not capital in reality. He ought to have followed up the remark by asking about the bonuses. How the company had managed to divide 10 per cent. among their shareholders for years past he did not know. It only showed that the company was so constituted that it ought to be very carefully dealt with. They asked the committee to authorize them to spend £100,000 in Norwich, and to recognize it of necessity as share capital raised for the purpose, as though they were in the position of a company coming to ask leave to raise the sum of £100,000 by means of shares. What they were doing was asking the committee to recognize the propriety of their spending £100,000 that they might then ask to be allowed to receive a certain per centage upon it. It was obvious that the public were interested when they were asked to be taxed, so to speak, a certain amount, in order to raise a dividend for the benefit of the company, because if the profit on the gas was to pay the amount of the dividend, the price would be regulated by that, and it was of interest to the public to know what amount was to be expended, and what amount of interest was to be attached to it. The company had the power of borrowing £50,000, if it desired, at 4½ or 5 per cent., and that they, no doubt, could do, because of the property they had. If, therefore, they wanted to increase their works, why should the committee be invited to give a *quasi* sanction to a further amount of capital at a rate of interest which ought not to be subscribed. Why should the company, who had unlimited powers of borrowing, come to the committee and ask for the maximum amount of dividend upon all they spend? He would rather invite the committee to say, "Raise your money in a more prudent and better manner, at a lower rate of interest, and do not tax the public at and to the extent you are now proposing to do." Having regard to the fact that the committee could not reach the internal arrangements of the company, the committee should say, "We will have regard to your constitution; we have our eyes open to the nature of that constitution, to the power you have of getting money, and we will take care that we do not deal with you upon the principle that share capital is all you have to deal with." That would be the right thing for the committee to do when they had limited the amount of capital to such an extent as they thought proper; then, to put a lower rate of interest upon it than the 7 per cent. which was asked for. He should like to show the peculiar nature of the company. Supposing the company were minded to carry on their trade at Norwich at a price of gas which simply repaid them for their labour and material, they would say "Now we want something out of Parliament to pay our 7 per cent." Supposing they borrowed the whole of their Norwich capital (and they could do so if they liked), and the committee insisted upon it, instead of their having shares, the company could then raise the £100,000, and they could get it at 5 per cent; whereas the committee were asked to give them 7 per cent. For what purpose? That they might, as large money lenders, get 2 per cent. upon the capital they advanced to Norwich, plus any profit they could make by their trade in gas. The trade in gas was to bring a profit supplemental to the cost of providing the capital. He noticed in the 1858 Act of the company a very curious chronological order of events. In 1858 the preamble stated that the company was instituted in 1824 by deed; and that in 1825 they bought up the shares of the old gas company which had been established in 1820. Notwithstanding that, in 1826 the old gas company were in Parliament asking for an additional capital of £30,000, without any recital that they had sold their birthright to the British Gas Company. He could not understand what the meaning of this singular kind of constitution meant, unless it was to evade the control of Parliament. The present bill was brought not for liberty to raise money, but to spend it. That being so, the committee should be careful in allowing them a maximum of 7 per cent. upon the whole of the capital which might be authorized. According to the figures, £100,000 had been spent upon the works during the last 50 years, and yet the committee was asked to double that amount of capital at once, to be applied by the company when and how they chose, taxable to the extent of 7 per cent. upon the whole of whatever sum they might spend. It had been said that the existing works were in capital order, everything being done so well that Mr. Stevenson said the goodness of the works was exceptional for the manner in which the trade was carried on. Therefore the committee was not asked to supplement a broken-down concern, but to augment an existing and flourishing concern, and grant at one coup a sum which had sufficed for a 50 years expenditure. How was the application for the £100,000 supported? One or two gentlemen had spoken of £20,000 in one direction and £20,000 in another that might be wanted in the course of a few years. As to the bulk of the £100,000, what was to be done with it, and where it was to be applied, nobody seemed to know, and the company had given no information on the subject. He would therefore ask whether the committee was not at once prepared to say that £50,000 or £60,000 was quite sufficient to grant to the company at present, leaving them to come some years hence to ask for more; and they were well able to afford to do that. Some one said something about the necessity of doubling the capital every ten years, but that was mere speculation. Then he approached the next subject—namely, the amount of dividend the committee would allow the company to take upon the capital. Here again came the proposition why the committee were to allow to these gentlemen, who submitted no question of borrowing money for the purpose of carrying on their business, a maximum amount of 7 per cent. upon the whole of their outlay, on the supposition that it was an outlay raised by share capital, when it was found to be a company with a power of borrowing any sum they chose. They had abstained from borrowing anything, and tried to get from Parliament a maximum rate upon the sum they advanced. It was clear that there was no equitable reason for asking the committee to give a sanction for the high rate of 7 per cent. On the contrary, he would invite Parliament to say, "The company has such ample and unlimited borrowing powers that we will take care not to give you 7 per cent. If you want to keep up your dividend at 10, you should do it by other means than by share capital." If the corporation of Norwich should succeed upon those two points—namely, in inducing the committee to reduce the amount of capital, and the amount of interest asked upon it—they would have gained all they expected to gain. He hoped the committee would think the corporation had done right in laying the matter before them on the narrower but more secure basis of capital and per centage.

The room was cleared for the decision of the committee. On the readmission of the parties,

The CHAIRMAN said the committee had found the preamble was proved, but there were several questions of clauses which they thought could be arranged

by counsel, who could make known the result at one o'clock on the following Monday.

The report of proceedings on the discussion of the clauses is necessarily reserved.

FRIDAY, MARCH 12.

LEICESTER WATER BILL.

Mr. POPE, Q.C., and Mr. LEDGARD appeared for the promoters; Sir EDMUND BECKETT, Q.C., and Mr. ROUND for the Corporation of Leicester, who opposed the bill.

Mr. POPE, in opening the case for the promoters, said the bill was introduced for the purpose of empowering the Leicester Water-Works Company to raise their authorized capital by the sum of £100,000, and for other purposes. It had been suggested by Lord Redesdale that the limitation of the dividends should be fixed at 7 per cent. instead of 10, and his clients had no objection to that alteration. As the result of that, a clause would be introduced into the bill limiting the dividends in the manner suggested. That additional capital was required, would be abundantly proved by the statements of Mr. Hawksley, the engineer to the company; it would, therefore, be unnecessary for him to occupy the time of the committee on that subject. He would, however, call their attention to the fact that one great reason for their wanting this additional capital was to improve the arrangements for the distribution of water. The special peculiarity of the Leicester water case had been, that the storeage works were larger than were necessary for the existing population. The result was, that there was a large amount of capital involved in those storeage works, which would become more profitable by spending money on the means of distribution. Those interested in the profits of existing capital were interested in a scheme which would make them more profitable than they were at present. It appeared from the petition in 1847 the company were authorized to construct their works by raising a share capital of £80,000. The company were unable to raise the capital, and in 1851 the corporation guaranteed the interest and dividend at the rate of 5 per cent. on the loan and share capital of the company, for the first three years after the laying of certain pipes, and 4 per cent. for the subsequent 27 years. They also took shares to the extent of £17,000. For this the corporation were to receive one-half of the surplus profits of the company, after payment of dividend to the shareholders at 5 per cent. for three years, and 4½ ever afterwards. The coporation paid £7758 in various sums, but the company flourished, and paid to the corporation about £17,000. The corporation were, therefore, gainers in that transaction. The corporation alleged that they were compelled to accept their portion of shares of A and B class. That was their own clause, and they were anxious to have them because the shares were valuable. If in the 10th paragraph, 7 per cent. was inserted instead of 10 (to which the company were quite willing to agree), the position of matters would be this, that the £100,000 should be raised upon the ordinary terms, all the shareholders should have their proportion of the new stock allotted to them in proportion to the original stock; that the corporation should retain their original bargain and their status as shareholders, but that the new stock should bear dividend at the rate of 7 per cent. for everybody, and beyond that the surplus should go to the reduction of price. As to the 11th paragraph, the meaning of it was positively this and no other. That if a person, being under needy circumstances, compelled to borrow money, made a hard bargain—if by the judicious use of that capital he came into the position of being able to extend his business and to borrow money from somebody else—the creditor was to say: "Although the bargain I made was a profitable one to me, you shall not be able to make a bargain with anybody else unless you make it on the same ground." That he could not understand. If he was right in his view that 7 per cent. should be allowed, there would be no surplus profits for anybody. He did not comprehend the ground on which the corporation sought to support their view, the circumstances being now so different. They having had the full "pound of flesh" for their assistance of 1847, still insisted on placing their knife in the company. In paragraph 12 the corporation declared that the company did not require the money. All he could say to that was that possibly they thought they would rather keep the water-works in an impecunious and needy condition, because if they did they would be able to buy them up so much the cheaper at some future day. He must, of course, satisfy the committee that the amount proposed was a reasonable one, and that he should be able to do most abundantly by the evidence. It was greatly needed for a proper distribution of the water, which was already stored in the reservoirs. It was proposed to provide channels of distribution for that water already stored, and on which they had spent the whole of their present capital. As to the shares of the corporation, the company did not wish to prohibit them from selling them if they wished to do so, and as to the new shares, they need not take them unless they chose. But they must not come before a committee and represent, as a grievance, that they were prohibited from taking shares, when the promoters say, if they will take the proper measures they shall be able to do so. He would also remark that any profits derived after the payment of 7 per cent. would go to the benefit of the consumers.

Mr. *E. S. Ellis*, examined by Mr. LEDGARD.

I am the chairman of the Midland Railway Company, and of the Leicester Water Company. I have been a director of the company since its incorporation in 1847, and have taken an active part in its affairs. The company were incorporated by the Act of 1847. The title of the Act is the Leicester Water-Works Act of 1847. It was for supplying the town of Leicester with water. They were the first water-works established for supplying the town with water. Under that Act the capital was £80,000, in shares, with the usual borrowing powers. They had borrowing powers on £26,000, or nearly one-third. Under that Act our reservoir was not the Bradgate, but the old Thornton reservoir, which supplied the then town by graviation. That was the only reservoir authorized by the Act of 1847. We tried to raise the capital in the town, but from commercial depression, by the potato famine and railway speculation, there was not sufficient confidence to enable us to raise the whole of it. I think we raised £60,000. We were not able to carry out the works. It was then that the amended bill of 1851 was brought before Parliament. By that bill there was no increase of capital. To raise the £80,000 capital, we found it necessary to enter into relations with the Local Board of Health. We made terms with them of this nature. The Local Board of Health undertook to subscribe for the shares not taken up by the public to the extent of £17,000. They were to have half the profits beyond 4½ per cent. upon the £80,000, in consideration of which they guaranteed payment of the dividend upon the capital of £80,000 for 40 years. That was carried out by the Act of 1851, and will expire in 1883. Under the guarantee the corporation have paid to the company £7758 14s. 11d., which is all they have ever been called upon to pay with respect to that guarantee. The increased revenue to the company commenced in 1856, and in 1859 the company paid over to the corporation surplus profits. The highest amount was in 1867, it being £2678; after that fresh capital had to be brought into the undertaking, and in consequence of the outlay of capital the surplus profits were reduced till 1872, when the amount paid over was £402; the next year it was more; the total amount paid to the corporation between 1859 and 1874 was £19,118, beside their profit on the shares that must continue if the works continue. There is no provision at all in our present bill to disturb that arrangement, and the value of that is put down by the corporation as worth £35,000—a capitalized sum. The water-works company would only be too glad to arrange with the corporation to buy out that contingent benefit at the sum which they have themselves put down—£35,000. The shares also are worth more than they were. In 1866, the capital of the old works being exhausted, we came to Parliament for further powers, it being found necessary to have further works and extend the business. It was under that Act that the Bradgate reservoir was constructed. The capital authorized by that bill was £120,000 in shares, and £30,000 by borrowing, making the whole capital of the company at the present moment £200,000 share capital and £56,000 by borrowing. The local board did not advance any money under that Act; we raised it in the ordinary way, and the local board took their proportion of the shares. At that time, although the local board had not been called upon to make any further payments, there was still a sum of £2518 17s. 11d. due by the company to them; and it was in consequence of that that we agreed to their having a division of surplus profits. It was an arrangement made with the corporation that the participation of profits should continue, but not after we had paid 4½ per cent., but 5 per cent. All our works have been constructed under those three Acts, and we have power to supply a very much larger population than there is now in Leicester; our works for collecting the water are much larger than our present means of distribution. The population of Leicester has increased very greatly during the last few years: in 1861 there were 68,056 inhabitants; in 1871, 95,220; and the present estimate is 109,000. We do not propose by our present bill to acquire any additional lands or construct any additional works, as we have power to supply 150,000 persons. We have expended all our share and loan capital, and £3000 in excess; our total power of raising capital being £256,000, and we having already spent £260,000. In my judgment it is absolutely essential to the interests of the company that they should be authorized to raise additional capital; we are constantly having applications from the inhabitants of new streets. We have not completed all the works of 1866, and that would cost some thousands. We require the additional capital in order to supply our present and future customers. Water-works consist of two parts, collection and distribution. We have two reservoirs in which we collect the water from the hills, one at Thornton, and the other at Bradgate, and those have an area of 200 acres of water, and they contain 800 million gallons. The Bradgate works expenditure under the Act of 1866, in consequence of the rise in value of material and labour, was greater than anticipated, and we have exhausted the whole of our capital; but we have the means of collecting and impounding a sufficient supply of water for 150,000 persons. The distribution of that water has to be provided for from time to time. The town is rapidly extending, and we have applications to lay down mains, but our present position is such that we have no money with which to do it. We have spent at the present moment £3000 more than we have power to spend, and unless we are authorized to raise more capital, we shall be brought to a standstill, and not be able to do what we ought to do. In four villages outside the town we have laid down mains which have cost us £3000. Upon the cost of those mains we get a return of 20 per cent., but that is only a part of the whole; it is not fair to take that as a sample of the whole of our profits.

By the CHAIRMAN: We consider that our extensions have not been unprofitable; and the extensions we propose to make in the streets, if we lay out £100,000, will, as a rule, produce a large interest on the £100,000 itself, because it distributes that which has been collected by the outlay of a large capital in other parts of the works. We should never lay down any extension of mains to supply houses or districts unless we were certain we should have a satisfactory return upon that outlay.

Examination continued: I do not think the sum we ask for is at all an unreasonable one. It would be inexpedient and improvident to come to Parliament too frequently, and we shall not actually raise the capital unless required, but we simply seek for power to raise it. The corporation hold 1700 shares at £25 each. The present market value of those shares is £8 to £9 premium. I consider the value of the corporation property in the water-works would be £50,000. Last year the corporation received in dividends on their share capital £2337 10s. besides surplus profits; the actual sum received was £3863, and they paid for that £42,000. We have to supply them with 6 million gallons of water for nothing—they have it free—and any further quantity they require is supplied to them at half the price paid by the largest of our other consumers.

By the CHAIRMAN: In that way they save £200 a year. Ours is a constant service.

Mr. LEDGARD: We have 60 fire-plugs. Our rates to all our consumers are less than what we are entitled to charge. We have three classes of shares; it would be of advantage to consolidate them; it would simplify the operations of the company. The corporation do not give us anything under this bill.

Cross-examined by Sir EDMUND BECKETT: I have a paper showing the dividends. The first was in 1854, under the guarantee of the corporation; that was 5 per cent.; in 1855 the same; in 1856 the same; in 1857, 4 per cent.; then we become incapable of payments. In 1859, it was 4½; in 1860, same; in 1861, £4 18s.; in 1862, the same; in 1863, £5 10s.; in 1864, £6; in 1865, £6 5s.; in 1866, £7; in 1867, £7; in 1868, in consequence of the new capital for the construction of the other reservoir, £6; in 1869, £6; in 1870, £5 10s.; in 1871, £5; in 1872, £5 5s.; in 1873, £5 10s.; and in 1874, £5 10s. I am not a member of the corporation. I ceased to be so a year ago. I was a member in 1866, when the Act was obtained. I have been chairman of the water-works 18 years. In 1866 we had not returned the whole of the money we had received from the corporation; I mean the corporation had not got it from the surplus profits. Under the operation of the guarantee, the sum that we had repaid in the shape of division of profits had not amounted to the sum we had received from the corporation by the sum of £2518; we then owed that sum to the corporation. In 1866 the purchase question was omitted from the bill. I did not take any part in that omission. I do not know how it came about; the town-clerk made that arrangement, and he is dead. No question arose as to the continuing of the power. Mr. Haxby is the solicitor to the company. When we found we were to be opposed by the corporation, Mr. Haxby had to look carefully into our position, and he discovered that that power had not been continued, and I told him that I thought it would be his duty to communicate that to the corporation, and he did so.

By the CHAIRMAN: The corporation did not oppose us in 1866. Arrangements were made with the corporation, and the bill passed. I did interest myself in the bill of 1866.

Cross-examination continued: I believe there was a general impression that the corporation had a right to purchase. Something was said about it at a meeting at which I was present. I did know that the corporation thought they could exercise the power of purchase, and that they had an idea of purchasing the water-works at that time, but I knew that they had no power, and I carefully avoided going into any discussion with the representatives of the corporation on the subject. Mr. Haxby was our solicitor in 1866, and carried that bill. The power of the Act of 1851 is admitted to exist, and the exercise of that power applies to works constructed at a cost of £106,000. Since then we have constructed another reservoir, and laid down pipes at the cost of £150,000; if the corporation had possession of the works which cost £106,000, they could not adequately supply the town with water, the two works are so mixed up. The pipes from Bradgate, laid down under the former Act, do not go all over the town. They do go all over the old part; they do not go over 9-10ths of the town, but a large portion. If we do get the capital we seek, I do not see that then it will be more difficult for the corporation to purchase if they have the power. The amount actually laid out in distribution lately was in 1874, £1753; in 1873, £953; in 1872, £925; in 1871, £1286; in 1869, £495; in 1868, £1190; in 1867, 607; and in 1866, £259; making a total of £8000, but that distribution mainly consists of 3-inch and 4-inch pipes, and Mr. Hawksley tells me that we have erred in laying down too many pipes of a small size; the extension of the town has rendered the mains, which were large enough to supply the outlying districts, too small; and as soon as we get this new capital, which we hope to get, we shall have to lay out very large sums in laying larger mains.

Re-examined by Mr. POPE: I cannot suggest any reason why the water company should be crippled in order that the corporation may buy it cheap. It would, I think, be suicide on the part of the corporation to prevent us from raising this capital, because the more we lay out the more productive the capital will be, and the larger amount they will get. It is to the interest of the corporation to have a good water supply. If they could cripple our supply the concern would be more easily bought if they wished to buy it. It is not to the interest of the public that it should be so. The corporation have never come to an agreement among themselves to buy. The allegation in their petition is that our raising the capital will throw an impediment in the way of the corporation if they wish to purchase; but there would be no real impediment, it would only increase the amount that would have to be paid for the property.

Mr. *Thomas Hawksley*, examined by Mr. POPE.

I have been the engineer of the water-works from their commencement. I designed all the works. They are in thoroughly efficient order, excepting as to the distributory-pipes in the town, and also some uncompleted portions of the authorized works. For those purposes additional capital is required. We have one reservoir supplying the town by gravitation, and the other by pumping. The drainage area of the Thornton gravitation reservoir is 2868 acres, its size is 70 acres covered with water, 90 acres altogether; its contents is 360 million gallons, it is 9 miles from Leicester, and 200 feet above the low parts of the town. The drainage area of the other reservoir is 4480 acres; its size 130 acres of water, and 170 acres altogether; its contents nearly 500 million gallons. They are very extensive works, but they are needed, because of the small amount of rainfall in the midland counties. We have only 27 inches per annum, half what they have in other places. Out of that we are not able to catch more than 8 inches over the drainage area, upon the average of three years. Droughts sometimes continue for 250 days, but the reservoir is made for 240 days of drought; so that we need a storeage, including inflows, for 250 days, in order to provide against drought.

By the CHAIRMAN: At Leicester we do have 250 days drought sometimes out of the 365. Near Boston we are obliged to have reservoirs to hold 360 days supply.

Examination continued: 3¾ million gallons is used every day. We have expended the capital necessary to collect and store about half as much more water as is required by the consumers. The water is filtered at both reservoirs. We have expended capital necessary for this large storeage, and upon works to deliver water of the best quality to the inhabitants of Leicester. We supply a population of rather over 80,000, that is to say, we have that number upon our books; but a good many people, as the water is constantly on, and as there is free access to many of the taps, appropriate the water, so that in reality about 90,000 persons are supplied with it. The public have been very liberally treated by the company as it regards their rates; that is especially so with regard to the small houses, of which there are two-thirds of the entire number in Leicester below £10. The company allow the unheard-of discount of 33 per cent. to all the owners of small tenements. The corporation are supplied with a large quantity of water for their sanitary purposes without any charge at all. I know the provisions of the Act of Parliament which have entitled the corporation to share in the surplus profits. The statutory liability of the corporation expires in 1883, whereas their rights go on for ever. I have myself gone into the calculation, which shows what proportion their share of the company has been as regards the great shareholders who have found the larger amount of capital; it works out upon the last year's income in this way:—The corporation get 8½ per cent. on their income, whilst the shareholders only get 5¾; this year the corporation will get 10 per cent., while the shareholders will only get 6½. The amount of capital which the corporation have provided as against that provided by other shareholders is £42,500 as against £157,000. I can explain the necessity for the additional capital. £25,000 is wanted at once; £10,000 for another reservoir, £10,000 for expension of mains, and £5000 for improvements generally. After that, in the ordinary course of water-works business, the outlay on the capital account, irrespective of making new reservoirs amounts on an average of years to 2¼ per cent. per annum; upon the total capital, including reservoirs, the outlay of a modern water-works company is as nearly as may be 5 per cent. per annum; we want 2½ per cent. per annum, excluding reservoirs. The capital which it is now sought to raise will in my judgment be exhausted in from 15 to 20 years. It is reasonable that provision should be made for that period beforehand, and capital would be raised as it is wanted. The amount of money wanted would be more at some periods than others; about five years before our powers are exhausted we should have to come to Parliament again, for another reservoir would then be wanted, and it takes about five years to construct one. There is no fear that the expenditure of this capital as alleged by the corporation will prove unremunerative. What we require is to expend this capital to give life to the dead capital that has been expended in reservoirs and leading mains; it is wholly unproductive now, all the revenue of the company is at present got out of small pipes. There is not any way in which the raising and employment of this capital will throw any impediment in the way of the corporation purchasing the works if they should seek powers to do so, because the same kind of purchase which would buy a broken-winded horse would buy a sound one.

Cross-examined by Sir E. BECKETT: At present I have only one horse, and am not seeking to get two. We want the capital in order to feed our horse, and put him in good condition. Nor do we want to double our capital. Our present share capital is £200,000, borrowing power £56,000. I say both reservoirs and leading mains are at present unproductive. The reason there was not money enough to finish the construction of the reservoir, although it was included in the Act of 1866, was, that the cost of constructing such works has so increased since 1866, that no estimate made then would apply now. If we could have foreseen that, no doubt we should have put more money into the Act of 1866. In 1866 we contemplated all that follows in the increase of mains and pipes. To a certain extent the necessity of this Act has come from the rise in prices, but not entirely; it has arisen in part from the growth of the town. I did know in 1866 that the town was growing, but it was not growing then so rapidly as it has done since. We provided reservoir space for a very large increase; my view was that within a quarter of a century or 30 years Leicester would become a town of 150,000 inhabitants. We could supply that number from our reservoirs at present if we could lay out £25,000 in the necessary pipes.

Mr. *J. B. Haxby*, examined by Mr. POPE.

I am the solicitor to the company. In the Act of 1866 there is no clause inserted to give owners of property under disability power to grant easements; that was omitted in 1866. I was solicitor in 1866. The omission of the power to purchase there was in no sense a trick of mine, neither was it intended to place the corporation in a false position. I never heard of its omission; it was lost by not being included with the other clauses. I have read the corporation petition, and there is nothing in that by which they ask to have any such clause inserted in the present bill, and this fact was made known to them before.

Cross-examined by Sir E. BECKETT: I was not surprised at finding the purchase clause omitted in 1866. I am never surprised at anything. I was not aware of the fact. I do not know who is responsible for it. I am not. If anybody had asked me if any such clause was in, I should have said I would look.

This concluded the case for the promoters.

Sir E. BECKETT, in addressing the committee on behalf of the petitioners, said the Act of 1866 had not one, but two mistakes. His learned friend who appeared for the promoters had cured the Act with regard to one thing, but not the other. No provision was made in the bill to give the corporation power to purchase at some future time, should they think it desirable. It was impossible to remedy that mistake now, and they would come to Parliament next year for a bill giving them that power. The corporation had no objection to allow the company to do what was necessary for the town of Leicester, and the sum of £25,000 would be ample for that purpose, and that would remedy the other defect of the bill of 1866. The whole question would have to be considered next year.

The room was cleared for the consideration of the committee, and on the parties being readmitted,

The CHAIRMAN intimated that they considered the preamble of the bill was proved.

COURT OF REFEREES.—WEDNESDAY, MARCH 17

(*Before Sir* JOHN ST. AUBIN, *Chairman; Mr.* PEMBERTON, *Mr.* RICKARDS, *and Sir* JOHN DUCKWORTH.)

BIRMINGHAM AND STAFFORDSHIRE GAS COMPANY'S BILL.

This was an inquiry into the *locus standi* of the various local boards, railway companies, and consumers of gas who have petitioned in opposition to the bill of the gas company, the main object of which is to confirm an agreement for the sale of their undertaking to the Corporation of Birmingham.

After some preliminary conversation as to the order in which the petitions should be heard,

Serjeant SARGOOD, who appeared for the Oldbury Local Board, remarked that the court would be better able to decide if they knew the nature of the two bills. Some thirty years ago the Staffordshire Gas Company got a clause put into their Bill, permitting them, subject to certain conditions, to sell their undertaking to the corporation. Last year they entered into a contract to sell. The Staffordshire Gas Bill and the Birmingham Corporation Bill were intimately connected with each other. The Staffordshire Bill was to obtain the confirmation of their agreement to transfer their works to the corporation; and, failing in that, they asked by the 1st of June next year to have means themselves of raising additional capital. The corporation, by their bill, asked to confirm that agreement, and thus acquire the works, and, having done so, to obtain unlimited borrowing powers for the purpose of carrying out the Act; and to obtain certain modifications of the operations of the existing Acts as against themselves, which Acts were invented for the advantage of consumers. This showed the importance of taking the two bills together. The Oldbury petition was against the transfer, but if they were not allowed to be heard on that, then they were adverse to the raising of additional capital; and, next, they were opposed to the corporation having powers adverse to the consumers. He urged that it would be impossible to decide such a case without taking both bills simultaneously.

Mr. GRANVILLE SOMERSET and Mr. STEPHENS having spoken in support of the argument of taking the two bills simultaneously,

The court intimated that they were all of one mind to take the bills separately, and, if necessary, they would reserve their decisions until they had heard both bills discussed.

Mr. CLERK was then heard on behalf of the Aston and Handsworth Local Board. He said that, under certain powers conferred by Act of Parliament, the Corporation of Birmingham had power to purchase the undertaking of the gas company, and the object of the present bill was to sanction such a transfer, and to enable the corporation to borrow money to carry on the business, the consideration for which was that the corporation should pay a sum of £10,906, and guarantee an annuity of 10 per cent., calculated upon the maximum dividend of the company. Further than that, they would find that the bill gave powers to raise a sum of £469,000, but there was nothing to show how that was to be applied. It was also set out that the reserve-fund of the company was not to be handed over to the corporation, but to remain with the company. These were arrangements which the inhabitants of Aston and Handsworth, which were contiguous to Birmingham, considered would injuriously affect them. These were important places, which had increased enormously during the last few years, as might be seen when he mentioned that in 1841 the population of Aston was 2847, whereas now it was 42,000; and during the same period the population of Handsworth had increased from 5205 to 16,400, the increase of rateable value being in proportion. These districts were included within the radius over which it was proposed that the borough of Birmingham should have the power to supply gas; and they were of opinion that the consequence of passing the bill would be materially to raise the cost of the gas supplied to the districts under the authority of the two local boards. They submitted that the terms of the agreement, especially as regarded handing over the reserve-fund, were contrary to public policy. His clients were taken unawares to a very great extent. In the year 1845 there was a power inserted in the Act of Parliament introduced by the gas company giving to the Corporation of Birmingham the right of purchase, but there was never much said about it, and the existence of such a power was to most persons unknown until the present bill was introduced. No attempt was made from that time to this to put the power in force, and it was only when the corporation came before Parliament that the authorities of Aston and Handsworth became aware that it was proposed to put in force powers obtained under very different circumstances to those existing at present. But further than that, the corporation wished to go beyond the agreement of 1845, and give the annuity of 10 per cent., whereas, had the agreement been otherwise, no further legislation would have been required. But such an arrangement required sanction at the hands of Parliament; and surely, if his clients' interests were so greatly affected by such a bargain, they ought to be heard in opposition to it. The result of such an arrangement would be to materially increase the price of gas in the districts he represented. If 10 per cent., representing the maximum dividend, was to be paid, besides the capital sum, it must follow of necessity that the price of gas should be increased. Then as to the reserve-fund. That fund was maintained in order that, when necessary, the funds should be forthcoming to pay the maximum dividend to the shareholders. In this case there was a very considerable reserve-fund; but yet, in addition to that, the shareholders were to receive in perpetuity a much more valuable thing, in the shape of a 10 per cent. annuity, than a dividend which might fluctuate. The keeping of that sum by the company was injurious to his clients, who contended that a very unfair bargain as regarded the consumers had been entered into by the corporation. Further than that, it was proposed to raise £469,000 of additional capital by Jan. 1, 1876; and this increase of capital, and the price that must be paid for it, must, he held, still further contribute to an increase of price.

Mr. G. SOMERSET, Q.C., appeared on behalf of the Local Board of West Bromwich, which he explained was quite beyond the Birmingham corporate jurisdiction. The population was now very large, and rapidly increasing, and there was every reason why the governing body should not give a similar body powers which they might beneficially exercise themselves.

Mr. PEMBERTON: I believe, Mr. Somerset, you expect soon to set up gas-works for yourselves?

Mr. G. SOMERSET: I expect we shall soon be as big as Birmingham, as we have more than doubled our population in 20 years. I do not see why we should be taxed for the benefit, for the improvement, or beautifying of another borough. The learned counsel went on to say that if such a bill as this were passed, the West Bromwich authorities would have considerable difficulties to deal with should they at any future time decide on manufacturing their own gas. For that reason he thought they were entitled to be heard against the bill.

Serjeant SARGOOD appeared for the Oldbury Local Board, and contended that the interests of his clients would be materially affected by the bill.

Sir M. WELLS addressed the court on behalf of the Local Board of Tipton, and pointed out that very great hardship would be inflicted if that and other local boards were debarred from appearing in opposition, especially as Tipton had no local board when the power of purchase was inserted in the company's bill.

Mr. CRIPPS, Q.C., for the Commissioners and Corporation of Walsall, contended that the Commissioners of Walsal were able to provide an adequate gas supply for the town, and were ready to undertake that that supply should be extended over the entire whole of the municipal area at a cheaper rate than could be afforded by the borough of Birmingham. In fact, instead of having gas at 2s. 5d., it would be raised to the Birmingham price of 3s. 6d. It would be very wrong for a power granted so long ago as 1845, which had never been acted upon, and of which his clients had never heard, should now be interposed to prevent the large population of Wallsall being heard on a matter so materially affecting their interests. There seemed to be very great anxiety to keep parties from being heard against the bill, and a technical objection had been taken to the petition, which now, he felt glad, had been withdrawn. It would be most harsh to the people of Walsall, under the powers of the Act, of which they could not possibly have had any notice, and which was not necessary in regard to the proper private and public supplies of gas.

Mr. WILKINS, solicitor, appeared for the Smethwick and Balsall Heath Local Boards.

The other parties petitioning and objected to, besides those already mentioned, are the proprietors of the Birmingham Water-Works, Midland Railway Company, Mayor and Corporation of Birmingham, London and North-Western and Great Western Railway Companies, owners and consumers of gas in Oldbury, owners and consumers in Smethwick and Balsall Heath, ratepayers and consumers of gas in Tipton, proprietors of iron-works and gas consumers in West Bromwich.

THURSDAY, MARCH 18.

Mr. LITTLER, Q.C., on behalf of the promoters, pointed out that the provisions of the Act of 1845, giving power of purchase to the Corporation of Birmingham, was then fully discussed, and an attempt to change the nature of the clause had not been successful.

Mr. CLERK, Q.C., then proceeded with his reply, and contended that the decision in the case of the Wigan Company, which had been cited as against the *locus standi* of the local boards, did not affect the present case, between which and that of Wigan there was no similarity. By an Act passed in 1861, the Wigan Corporation were authorized to buy the gas-works, and the limits of the district over which their then acquired jurisdiction should extend was distinctly defined. An Act was obtained in 1872 by the Hindley Local Board, which exempted them from the jurisdiction of Wigan, and authorized them to establish gas-works of their own, so that the claims of the local board to a *locus standi* against the bill was a very different thing from that put forward on the present occasion.

Mr. RICKARDS said the claim of the Hindley Local Board was refused for that very ground, that they had obtained powers to make gas-works of their own.

Mr. CLERK did not question the decision of the referees, but would again urge that the claims of the local board on that occasion and in this were very different.

After some conversation, the CHAIRMAN announced that the court were of opinion that the *locus standi* of the following had been established:—Aston, Handsworth, Tipton, Oldbury, Smethwick, Walsall (commissioners and corporation), and West Bromwich (commissioners).

Mr. GATES then addressed the court on behalf of the consumers in Smethwick and Oldbury, contending that though it was urged that these parties did not represent the district, yet they had a substantial interest which he considered entitled them to be heard.

Mr. STEPHENS, who appeared for consumers within and without the borough of Birmingham, said his clients viewed this bill with general apprehension. It was not an honest bill. It did not disclose what it meant to do. They would find that the annuities were to be charged on two undertakings, and they found an agreement of 1874, upon which, when this bill was passed, such an arrangement would be put into force. It might be one thing to object to consumers objecting merely to the carrying out of former legislation, but it became a very different thing when two companies were to be amalgamated or bought up, and competition got rid of. Competition at present operated in favour of the petitioners, both with respect to the cost and the quality of the gas; and if they were not heard now, they would not have a chance of being again. He contended that, in the present case, as had been laid down in another by a joint committee of the two Houses of Parliament, a technical objection should not be allowed to interfere with the establishment of *locus standi* by traders who were largely interested.

Mr. LITTLER contended that there was no proof that the petitioners had a right to represent either the ratepayers or consumers in the borough.

Mr. SOMERSET then addressed the court on behalf of proprietors of iron-works and large consumers of gas at West Bromwich. The petitioners he represented paid a rental for gas of something like £2000 a year, and they had reason to believe that under the bills which were now being introduced they would suffer both in respect to the price and the quality of the gas. With regard to cases in which consumers had established their right to be heard, he instanced the South London, 1872, where, after the *locus standi* of the public bodies had been established, that of certain private consumers was allowed. He did not consider that a stronger case could be urged than that; but he must mention the Alliance and Dublin Gas Bill, 1871. There the corporation as well as certain gentlemen petitioned against the bill, and there the consumers pleaded that the action of the corporation to reduce the value of public lighting would rather tend to act against the consumers in delaying a reduction of the charges against them. In this case also he contended that the local bodies and the consumers had different interests.

Sir M. WELLS, for consumers and ratepayers in Tipton, objected to the control of the gas supply being placed in the hands of the Corporation of Birmingham. Having been a counsel engaged in the matter of the South London Gas Bill, he considered it was then established that the consumers had a direct interest. They were, in fact, in that case the only persons affected to any extent in regard to the difference which might be caused in the price of gas. He held that there was a strong similarity between the proposed absorption and an ordinary amalgamation, and that the consumers had as good a right to be heard in the one case as the other.

After hearing counsel in reply, the referees retired, and on their return

The CHAIRMAN said that in the case of the owners and occupiers and consumers of gas at Oldbury, owners, &c., in Smethwick, ratepayers and consumers in Tipton, and owners of iron-works and consumers in West Bromwich, the claim for *locus standi* had not been established.

It was stated that the Balsall Heath Local Board had withdrawn, and it was agreed that the matter should be further proceeded with on Monday, the 22nd.

PROPOSED SALE OF THE LONGTON GAS-WORKS.—On the 15th inst. an extraordinary general meeting of the shareholders of the Longton Gas Company was held to take into consideration a proposal on the part of the directors to dispose of the works and undertaking of the company to the corporation of the borough. There was no opposition, and it was resolved to empower the directors to sell the works and enter into a preliminary agreement with the corporation for such sale upon the terms stated in their proposal—viz., the proprietors to receive £20 for each £10 fully paid-up original share, entitled to 10 per cent. dividend, and £14 for each £10 ordinary 7 per cent. paid-up share, entitled to 7 per cent. dividend; the corporation to pay off or take over all mortgage loans, and bear all other liabilities and expenses incidental to the transfer.

Legal Intelligence.

COURT OF CHANCERY.—MONDAY, MARCH 15.
(*Before the* MASTER OF THE ROLLS.)

STANSFIELD *v.* CORPORATION OF BRADFORD.

This was a sewage nuisance case. The bill is a supplemental bill, filed by the owner of the Esholt Hall estate, situate on the river Aire, below Bradford, in Yorkshire. It prays the benefit of a consent order made in February, 1869, at the hearing of the original cause, whereby it was ordered that the defendants should, on or before the 11th of January, 1872, take practical measures for defecating the sewage of Bradford, before allowing it to fall into the river Aire. The case came before the court upon motion by the plaintiff for an injunction.

Mr. SOUTHGATE, Q.C., and Mr. INCE were heard in support of the motion.

The ATTORNEY-GENERAL and Mr. FREELING, for the defendants, said they had done all they could do within the time to remedy the nuisance, which they admitted to exist. They had tried the process of the Peat Engineering and Sewage Filtration Company, Limited, and were about to adopt another process, which they trusted would answer their expectations. The balance of convenience, they submitted, was against granting the injunction, for it would be a serious thing for the district if the numerous houses now being erected were not to be drained into the sewers.

The MASTER of the ROLLS said the order he was about to make would not prevent the draining of such houses into the old sewers, and granted an injunction, until the hearing a further order, against causing or permitting any new outfall into the Bradford Beck, or any new sewer communicating with any outfall into such beck, whereby any sewage not effectually defecated would pass into the river Aire, so as to be a nuisance to the plaintiff. Liberty for either party to apply to advance the cause.

THURSDAY, MARCH 18.
(*Before Vice-Chancellor* BACON.)

THE COAL ECONOMIZING GAS COMPANY—IN THE MATTER OF GOVER.

In this case, Miss Mary Ann Gover, shareholder, sought to have her name removed from the register, upon the ground that material facts had not been stated in the prospectus. She was the holder of ten shares, and the application was made under the 38th section of the Act of 1867, which stated that every prospectus of a company, and every notice in writing, inviting persons to subscribe for shares in any joint stock company, shall specify the date and the names of the parties to any contract entered into by the company, or the promoters, directors, or trustees thereof, before the issue of such prospectus or notice, whether subject to adoption by the directors of the company or otherwise; and any prospectus or notice not specifying the same shall be deemed fraudulent on the part of the directors and officers of the company knowingly issuing the same, as against any person taking shares in the company on the faith of such prospectus, unless he shall have had notice of such contract. The applicant alleged that one contract was disclosed upon the prospectus, but there was another entered into by Mr. Mappin (who was stated to be a promoter) with Mr. Skoines, the patentee, which was withheld. On the part of the company, it was argued that the contract referred to was entered into by Mr. Mappin, not as a promoter, and certainly not as a director or officer, because the company was not then formed. The company was started for the purpose of working a patent for improvement in the manufacture of gas, taken out by a Mr. Henry Skoines. Mr. Skoines, by a memorandum of agreement, dated July 25, 1873, contracted to sell his patent to Mr. Walter Sandell Mappin for £65,000, £1000 paid at that date in cash, £4000 to be paid in cash within 21 days after an allotment of shares in a company, to be formed and registered with limited liability by Mr. Mappin for the purpose of working the patent, £15,000 in preference shares, bearing interest at 15 per cent., and the balance £45,000 in ordinary shares of the company. One of the terms of the agreement was that Mr. Mappin should, with as little delay as possible, use his best endeavours to form such a company, with a capital not exceeding £150,000. Previously to the formation of the company, Mr. Mappin entered into an agreement, dated December 23rd, 1873, with Mr. James Hanson Wright, as trustee for, and on behalf of, the company intended to be forthwith formed, by which Mr. Mappin agreed to sell the patent for £125,000, payable as to £7500 in cash within 21 days after the resolution of the directors for allotment, £7500 in cash two months after, £45,000 in preference shares, giving a preference dividend of £10 per cent., and the balance, £65,000, in ordinary shares. Mr. Mappin also became a director of the company when formed. A prospectus was issued inviting subscriptions for shares, which properly described the agreement for sale by Mr. Mappin, but took no notice of the agreement under which he purchased the patent.

Mr. JACKSON, Q.C., and Mr. INCE for the applicant.

Mr. KAY, Q.C., and Mr. MONTAGUE COOKSON for the company.

The VICE-CHANCELLOR said the case was not without difficulty, arising from the language of the 38th section, which had been relied upon. It was argued that because Mr. Mappin entered into an agreement to purchase Mr. Skoine's patent, and afterwards sold his interest in that patent to the company, that fact ought to have been stated in the prospectus. But Mr. Mappin had denied he ever was a promoter of the company, which, at the time the agreement was entered, had no existence. It was argued, further, that he must be considered a promoter, because, in his agreement with Skoines, he had bound himself to aid the formation of a company. But this he might do without being a promoter. He might have advertised the fact of his purchase from Skoines, and pointed out how advantageous it would be to a company to purchase from him. But that would not *ipso facto* make him a promoter. There was no evidence of his being a promoter, and his positive assertion was preferable to reasoning, which was all that had been attempted. It certainly was not incumbent on Mappin when he contracted to sell to the company, to inform them of the price he had paid Skoines. There was no failure of equity in this, because it was not iniquitable for a man to buy in the cheapest and sell in the dearest market; and he could find no fiduciary relationship between the parties. The applicant could not, therefore, escape from the consequences of the contract into which she had entered, one of which was to contribute towards payment of the company's debts. The application failed, and must be dismissed with costs.

THE ATTORNEY-GENERAL *v.* THE CORPORATION OF BIRMINGHAM.

Mr. EDDIS, Q.C., and Mr. RODWELL appeared for Sir Charles Adderley, the relator; Mr. WM. PEARSON, Q.C., and Mr. COZENS HARDY represented the Birmingham Corporation.

Mr. EDDIS said in this case, as his honour would remember, an order had been made against the Corporation of Birmingham for sequestration. A motion to suspend the issue of the writ had stood over from time to time, and had appeared on his honour's paper. The parties had now arranged an order upon the motion, and the proposed minutes of decree would settle the whole matter. The learned counsel read the minutes, from which it appeared that the parties had agreed to an order discharging the writ of sequestration, dated the 27th of July, 1872, and the injunctions of the 23rd of July, 1858, and the 16th of May, 1871, respectively; and that a perpetual injunction be awarded restraining the corporation from causing or permitting the main sewers in the information and bill mentioned, or any additional sewers which may have been constructed by the defendants pursuant to the leave in that behalf given by an order, dated the 19th of November, 1874, or which may hereafter be constructed by them, to be

discharged; or the sewage of the said borough in any manner to drain or pass into the river Tame, so as to create or continue the nuisance complained of by the information and bill—that is to say, such a pollution of the river Tame as to render it injurious to the health of the inhabitants of the houses adjoining its course, or such a pollution thereof as that it may be or become offensive and unfit for use, or injurious to health, where it passes through the grounds of the relator and plaintiffs. The defendants (the corporation) undertook to carry on, and with all due diligence complete their works now in course of construction for the purification of the sewage of the borough, and Sir C. B. Adderley undertook that he would not within a period of five years from the date of this decree take any proceedings in this cause or otherwise against the defendants, for or by reason of any breach on their part of the injunction, other than such proceedings as may be necessary or proper for compelling the due performance by the defendants of the said undertaking; and the defendants undertook that such postponement on the part of the relators and plaintiff shall be without prejudice to any such proceeding as may be taken by them after the expiration of the said period of five years. And the plaintiff, Sir C. B. Adderley, consenting, it was arranged that an order of the court should be made that the defendants, on or before the 1st of May next, do pay to Sir C. B. Adderley the sum of £6000, and that that sum be received by him in satisfaction of all claims in respect of damages occasioned to him, and of the costs of this suit to the date of the decree.

The VICE-CHANCELLOR inquired whether the injunction was to be enforced from the present date or postponed.

Mr. EDDIS replied that it was to be postponed for five years. It was not proposed to enforce it in the interval, except in the case of breach by the defendants of their undertaking to proceed with the works. The relator was to be at liberty to complain to the court; but subject to that, the injunction was to be suspended for five years.

After some conversation as to the wording of the order, the court gave leave for the cause to be put down *pro formâ* on Wednesday (to-morrow), recommending counsel in the meantime to see that the order was in the most convenient form.

Mr. PEARSON, in conclusion, remarked that his honour would after that hear nothing about the case for five years.

The VICE-CHANCELLOR: Perhaps you are promising too much. A breach of this undertaking will plunge me into this common sewer again.

MANCHESTER SPRING ASSIZES.—THURSDAY, MARCH 18.

(Before Baron POLLOCK *and a Special Jury.)*

METCALF *v.* MAYOR AND CORPORATION OF BOLTON.

This was an action for breach of contract. Mr. AMBROSE, Q.C., and Mr. SMYLEY appeared for the plaintiff; and Mr. POPE, Q.C., Mr. LERESCHE, and Mr. BLACK, for the defendants.

Mr. AMBROSE, in opening the case, said the plaintiff was a manufacturing chemist, carrying on business at Miles Platting, and for the purposes of his business he required large quantities of gas tar. That substance had become very valuable in the chemical manufacturing trade, but in 1871 Mr. Metcalf tendered for and obtained a contract with the Bolton Gas Company, by which he became entitled to all the gas tar which might be made at their works for the period of three years from the date of the contract. According to the terms of the contract, the company were to deliver to Mr. Metcalf in tanks all the gas tar they manufactured, and there was a corresponding agreement on the part of the plaintiff that he would during that period take from the company all such tar as they might have for sale. There was a further provision by which the gas company were entitled to rescind the contract in case of his not paying or being guilty of certain breaches, and there was a further provision also by which the company were entitled to reserve a proportion of not less than 1-10th of the whole tar they might manufacture, that retention being for the use of their own customers. The matter went on all right for twelve months, at the end of which time the corporation of Bolton obtained an Act of Parliament authorising them to purchase the undertaking from the Bolton Gas Company. The result was that the undertaking of the company was transferred to, and became the property of the corporation. That being so, the liability of the present contract was recognized by the Bolton Corporation, and they proceeded to deliver the tar in accordance with the contract, and no complaint was made against them until March, 1874, when gas tar became advanced in price. It then came to the knowledge of the plaintiff that tar was being delivered to a man named Barrow, who was a competitor of the plaintiff's, and who carried on business at Gorton, near Manchester. He (Mr. Ambrose) need scarcely tell the jury that manufacturing chemists, when those contracts were entered upon, had the command of the market, and the prices were very much regulated by their having the power to purchase the tar from large gas companies. At the time in question, between March and April, 1874, as he had already hinted, it came to the knowledge of the plaintiff that the corporation were not keeping faith him, that they were supplying the gas tar to a rival in the trade, who neither lived in Bolton nor had bought any from them before, and, in fact, he ascertained that they had sold in that month of March no less than 115 tons to Barrow, the profit on which would amount to a large sum, certainly not less than £1 a ton, as the plaintiff had contracted for it at the rate of 16s a ton. That was the breach on account of which the present action had been brought to recover the difference between the market value of the tar and the price at which the plaintiff had agreed for it.

Mr. *Thomas Metcalf*, the plaintiff, was then called, and after confirming Mr. Ambrose's opening statement, proceeded to state that in March and April, 1874, he could not have purchased 115 tons of gas tar in the market. It could only be obtained from the large gas-works. It was usual in the trade to sell it upon long contracts. If he could have bought it he could not have got it for 36s.—he would have had to give 40s. per ton.

Cross-examined by Mr. POPE, *witness* said that about March, 1874, he was in arrears of payment, but he could not say whether they amounted to £567 3s. 11d. The corporation served him with a writ for payment. In June the same year, he was again in arrears to the amount of £353 1s. 6d. which was paid in July, after he received another writ.

Mr. POPE said the figures showed the corporation delivered more than they were bound to do. In 1871-2, the first year of the contract, the company manufactured 2176 tons of gas tar, and Mr. Metcalf had it all excepting 28 tons; in 1872-3 they manufactured 2289 tons, and he got it all but 47 tons; and in 1873-4, the year in question, they manufactured 2687 and he got it all but 178 tons.

Baron POLLOCK (to Mr. Andrews): You must prove there was more than that manufactured.

Thomas M. Bird, boatman, was then called. He said he knew the gas tar wells of the Bolton Gas Company, and he could tell by pumping whether they were pretty full or very low, because if they were very low they would not pump. He was at the wells the last day in June, and he took two boat loads of tar away. He could not say how the wells were then—they could not be full because they took out the two boat loads.

By Mr. POPE: He took away 47 tons.

Mr. *Alexander Forrest*, of the firm of Smith and Forrest, Holt Town, oil distillers, said that in March and April, 1874, tar could not be easily got in the market. They were then paying from 35s. to 40s. a ton for it.

By Mr. POPE: They were buying it in 100 ton lots at that price from tar distillers in Manchester.

Mr. *Harrison Veevers*, manager of the Bolton Gas-Works, who had been subpœnaed by the plaintiff, said the corporation had three gas tar wells. There was one at the Lum Street works of 100 tons capacity, and in June, 1874, there were about 17 tons of gas tar in it. There was no gas tar in the other wells, because the contractor had taken the tar out very frequently about that time.

Mr. AMBROSE said he had different instructions as to what the witness would have to say. That was his case, and he could not carry it further.

Baron POLLOCK: There is no case; you have not proved one at all. It lies on you to prove that the corporation retained more than one-tenth of the gas tar.

Mr. AMBROSE: That is really a construction of the contract which I cannot adopt. Moreover, Barrow was not a customer of the corporation.

Witness continued, and stated that the gas company had been accustomed to sell gas tar to persons in the neighbourhood in small quantities, and they also used it themselves to tar palings and roofs, &c.

By Mr. POPE: *Witness* said the company made other products, sulphate of ammonia, coke, spent lime, &c., for which they had various customers. The total income of the gas company in the year 1873 for other things than gas was about £24,000.

Mr. POPE: So that you had customers to the value of £24,000 in that year for other things than gas?

Witness: Yes.

Mr. POPE: The total amount which Metcalf took during 1873-4 was about 2600 tons at 16s. a ton, was it not?

Witness: Yes.

Mr. POPE said there was nothing in the contract binding the corporation not to sell to other persons. They were bound to deliver the crude tar, less than one-tenth, which they manufactured in a certain manner and at certain times, and it was expressly provided that there should be no obligation upon them to manufacture any crude tar whatever or to deliver any whatever. Neither were they bound to deliver it at any stated times or in any stated ways. They were absolutely entitled to retain one-tenth for their own use and the use of their customers.

Baron POLLOCK: And you say that any one who buys is a customer.

Mr. POPE: Yes. I don't know what it means, but that we may sell it if we choose to any one. I say that my friend must be nonsuited on that ground, though of course he may address the jury upon the question of damages if he likes.

Baron POLLOCK suggested that Mr. Ambrose should take the opinion of the jury on the damages.

Mr. AMBROSE said he would not disguise the fact that as regarded the large amount they thought to recover in the action he was disappointed. He contended, however, that he had shown the price of gas tar was from 36s. to 40s. a ton at the time of the breach, and the plaintiff had made a contract for it at 16s., so that he was entitled to the difference between the two sums on the 115 tons.

Mr. POPE submitted that the fact that the corporation sold the gas tar at 18s. a ton to Mr. Barrow, or 2s. more than the contracted price with Mr. Metcalf, was worth more than any speculations as to the market value of it.

By direction of Baron POLLOCK, a verdict was entered for defendants (the corporation), with liberty for the plaintiff to move. The jury for that purpose assessed the damages contingently at £35.

WESTMINSTER POLICE COURT.—TUESDAY, MARCH 16.

(Before Mr. WOOLRYCH.)

SUMMONS FOR GAS-RENT ALLEGED TO HAVE BEEN PAID.

The adjourned hearing of the summons taken out by the London Gas Company against Mr. *George Denton*, landlord of the "Shuckberg Arms," Denyer Street, Chelsea, to recover £14 0s. 9d. for gas due to them, was held this day. The case was before the bench on the 9th inst., when the facts, as briefly reported in our last, were gone into, Mr. Woolrych then expressing an opinion adverse to the gas company. It appeared that the amount of the claim was not in dispute, but the defendant stated that on the 20th of January a man called to whom he had paid previous gas accounts, presented a printed paper, asked for the amount, and was paid by the barmaid with £14 in gold and three threepenny pieces. The man handed her a paper which she thought was a receipt, but on after examination it was discovered to be simply a meter ticket, indicating the amount of gas consumed during the previous quarter, and the sum owing to the company. Mr. Arthur Dove, who then represented the company, said notice was given to the consumers that only printed receipts of the company were recognized. Mr. Smyth contended that an authorized document of the gas company in the possession of some one who had previously collected accounts was *primâ facie* evidence, either that they were employed, or, on the other hand, of carelessness. If it was the latter, certainly his client ought not to be made to suffer for the mistake. After hearing the evidence, the magistrate said he was satisfied that the defendant had paid the money, and he refused to make an order; upon which Mr. Dove asked for an adjournment, which was granted.

Mr. BESLEY now appeared for the company, and stated that he had Mr. Booth, the former collector for the company, in court, and he had been shown to the barmaid who paid the money. She had said that he was not the person whom she paid. Besides this, he had other evidence to call, and he hoped to alter his worship's opinion. If the company were to submit to his previous judgment, they would be precluded from recovering in the county court, and, in fact, any court, because the decision would be final. This matter was of far greater importance than would be at first thought, to the London Gaslight Company, and if the point was decided against them, it would open a very dangerous door to fraud. He submitted that in point of law the payment must be to an accredited agent of the company, and that there could be no accredited agents who were not armed with properly printed receipts. He should be able to show that since 1871 the defendant had always paid the authorized collectors of the company, and that sometimes payment was not made until nearly three months after the account was due. In the present instance the barmaid swore that the payment made by her was 26 days after the date, and he had evidence to show that when Mr. Williams, the proper collector, called some days afterwards, she told him to call for the money on the following day, and said nothing whatever about having already paid any one else. When called upon to do so, however, she could not produce any receipt, and merely showed what was called a meter note.

Mr. WOOLRYCH said it appeared to him that there had been some negligence on the part of the servants of the company. It was sworn that the meter ticket in question was given to a particular man on a particular day, and yet he—another servant of the company—denied this on his oath. This pointed to the fact that it was obtained from the office out of the ordinary course, and that it in some way fell into hands it had no business to get into. He had a discretion whether he made the order or not, and he repeated that he considered there was some evidence of negligence.

Mr. BESLEY said he should submit that a magistrate, under the circumstances, was legally bound to make the order, and then if there was any negligence, the company would be liable for it by action.

Mr. WOOLRYCH said he should like to know if Mr. Besley thought that if one of the collectors of the company were paid, and he gave a manuscript receipt, the consumer could be called on to pay again. He decidedly thought not.

Mr. BESLEY did not think it would be a good payment. He should like Mr. Woolrych to hear the case out, and he would call before him all the servants who could possibly be accredited agents in any shape or form. Then if his contention in law was correct, even if there was evidence of negligence on the part of the company's servants in losing a meter ticket, it would not affect the

arrangement made by the defendant for years, of paying only when a printed receipt was given Besides this he had the defendant's own handwriting to an agreement or contract under which he was supplied with gas, and one of the conditions of that agreement was that the company would not recognize anything in satisfaction of a claim except a printed receipt. [This agreement was produced.]

Mr. *E. J. Booth*, examined by Mr. BESLEY, deposed that he was a former collector to the London Gaslight Company. He could not swear to Mr. Denton's handwriting, but the agreement made between him and the gas company, dated Nov. 9, 1871, he believed to be signed by him.

Mr. DENTON admitted that it was his signature to the document.

Mr. *Booth* then proved that, in every case while he was collector, a printed receipt was given to the defendant on payment of his quarterly accounts. The witness produced the counterfoils in his books. He had never had to call more than twice for the money when the landlord was in, nor had he ever taken money without giving a printed receipt.

Cross-examined by Mr. SMYTH: He never had the slightest difficulty in getting his money from the defendant. He was in the employ of the company five years, and he left last July. He had never employed anybody to collect for him, except his son. He collected in Maude Grove, Brompton, but did not at any time tell a gentleman named Powell, living at No. 7, that on one occasion he had been ill, and had been obliged to employ a deputy. He did not call at that house for the money, and when shown a receipt for it, say that the man he employed had kept back about £70 belonging to the company, and he would have to make it good.

Mr. *Thomas Williams* said he succeeded Mr. Booth as collector. The defendant had on previous occasions paid him money in settlement of gas accounts. He went on the 22nd of February last to collect the rent for the Christmas quarter, which amounted to £14 0s. 9d., and he saw the barmaid. She said: "You must call again;" and the reply was: "Very well." He did not see Mr. Denton then. The barmaid did not make any remark about the gas-rent having been previously paid. Witness called on the following day, and asked for payment. Mr. Denton then said he had paid it; that he was busy at the time, and handed the money to the barmaid. He (Mr. Williams) then spoke to the barmaid, and she repeated that she gave the money over the bar. She was asked why she had not mentioned it the previous day, as it ought to have been reported to the office at once, and Mr. Denton turned round and said: "If you require it, I will go to the office to-morrow."

Miss *Agnes Heald*, the barmaid, was called, and in reply to questions, she stated that it was not Mr. Booth to whom she paid the money. She had been five years with the defendant, and knew Mr. Booth. When Mr. Williams called for the account the first time, she told him to come again.

In reply to Mr. WOOLRYCH, witness said, when she told Mr. Williams to call again, she had forgotten the circumstance that she had already paid the account to another man. She thought of it afterwards, and then looked on a file for the receipt, when she found only the meter ticket. She knew Mr. Williams was the collector since Mr. Booth left, and on one occasion previously she paid the gas-rent to him.

It having been stated at the first hearing that, in some instances, persons who had printed receipts of the company had been applied to a second time for payment,

Mr. *Henry Wm. Head*, chief clerk of the company, was called, and stated that when Mr. Booth left he returned his books. Since Mr. Booth left last July, the company had not found a single case of gas-rent being returned as unpaid, when, in fact, the account had been settled.

Mr. SMYTH, in addressing the magistrate on behalf of Mr. Denton, said he was a respectable licensed victualler, whose character and that of his barmain were at stake in this matter. He then proceeded to recapitulate the facts, pointing out that the defendant and his barmaid both had a perfect recollection of the occurrence, and corroborated one another. He also commented on the fact that the meter-note had been tendered as a receipt to the defendant, and the gas company could not account for how it got into possession of a stranger. Mr. Booth had sworn that he never employed any one to do his work, but he should call a gentleman of high respectability, who would get into the box and say that Mr. Booth told him quite the contrary, and that he was the loser by the defalcations of his deputy. He hoped that the magistrate would still think the same as he did the previous week, for it certainly would be a very hard case if his (Mr. Smyth's) client was called upon to pay the money twice.

Mr. *Rubens Powell*, of No. 7, Maude Grove, Chelsea, was called, and stated that when Mr. Booth called upon him for his gas-rent in July last, he (witness) produced a receipt, showing that it had been already paid, and that when Booth saw the receipt he remarked that he had been ill, and employed a deputy, who had taken this and other money, amounting in the whole to £70 or £75, for which he (Booth) would have to be responsible to the company.

Mr. BESLEY severely cross-examined the witness, who, referring to some professional business which he had in hand at the time, fixed the date as not earlier than July 21, 1874.

Mr. *Head* was thereupon recalled, and he proved that Booth left the service of the company on July 9, that he gave up all his books and papers at that time, and had done nothing in the way of collecting for the company since.

Mr. BESLEY demanded to see the receipt which witness said he showed to Booth, but it was not forthcoming, although witness admitted that he had been directed to produce it.

Mr. WOOLRYCH said the case was put upon a different footing that day. It had been shown in evidence that it was part of the contract between the consumers and the company that nothing but a printed receipt should be recognized as a discharge for the gas-rent. This was a condition of the document which the defendant signed when he engaged to take a supply of gas from the company, and this constituted an agreement between the parties which governed and regulated all their subsequent transactions. He entertained no doubt whatever that both Miss Heald and Mr. Denton were perfectly satisfied that they paid the money, and some very cogent evidence had been offered that, in point of fact, it really had been paid; and yet other evidence had been produced which, to a certain extent, impugned their statements. There was one matter which specially struck his attention in the case—viz., that a long series of receipts had been laid before him, which proved that in every instance, for a long time previously, the payment of the gas-rent was not made by the defendant until nearly a quarter of a year after the application, by delivery of the meter ticket by the company. It was only in this one instance out of many that so early a payment had been made. It certainly was a matter of remark that this was at variance with the usual practice as to payment. The whole of the printed receipts laid before the bench, which had been in the hands of different collectors, were nearly all at equal intervals of three months. It was also further to be remarked—and it was a very peculiar fact—that, when Mr. Williams, the present collector, applied for the last quarter's rent, the barmaid never said anything about the amount having been previously paid. Her explanation was that she did not think about it at the time, and he (Mr. Woolrych) was not casting any reflection upon her veracity, for she appeared to give her evidence very fairly. Still it was a criterion of the correctness of her memory of the transaction, and he was disposed to attach more importance to her silence when the demand was made, than to the version she now gave after reflection, and after the opportunities she had had of talking over the matter with Mr. Denton on the following day, and searching for and discovering the document produced. It was exceedingly difficult now to determine how far that subsequent discovery might have influenced her recollection of the facts. Seeing that Mr. Williams applied for the amount within a week or ten days of the time of the alleged payment, he (Mr. Woolrych) would have thought she would, whether Mr. Denton was there or not, have said: "Why, I paid this bill myself," especial as she now remembered the particular coins in which it was paid. However, she did not do so, and her explanation was one that was not quite satisfactory. When the case was before the bench at the first hearing, in the absence of much evidence given to-day, and not having seen the contract, but simply having seen a notice at the foot of the printed demand, that nothing but printed receipts would be recognized by the company, he expressed an opinion, to which he still adhered, that if it were proved to him, in point of fact, that a party authorized to receive money had received it, and had not given a printed receipt, he should not hold that such a notice rendered a written receipt invalid. But it was a very different thing when he found in the actual contract which the defendant had signed as constituting the basis of his dealings with the company, a provision that nothing but printed receipts would be recognized. He had come to the conclusion that it would be his duty to make the order asked for by the complainants. If the money had been already paid by the defendant, it would, unquestionably, be a case of great hardship, and he was satisfied that Mr. Denton firmly believed in his own mind he had paid it, because he actually described the precise kind of coin which he parted with at the time, and, moreover, he had shown the strength of his conviction by defending the claim now made against him. No doubt the document which he produced was not a receipt for the money at all; it was a simple demand note, and the view which he (Mr. Woolrych) took at the first, in the absence of evidence now laid before him, was that there had been some gross negligence on the part of the company, and that these documents had got into the hands of an unauthorized person, who had made an improper use of them, and that this money had been received by him. He had regarded this as one of that class of cases in which parties have become sufferers by a breach of duty in those with whom they had dealings, and if that had been proved to him beyond all doubt, he would probably have refrained from making the order. But that was not the case as put to him that day. All the collectors had been before him, the course of the company's business had been disclosed, receipts had been produced, and the intervals between the applications to defendant for payment and the usual time of payment had been made clear. In addition to that, there had been a direct contradiction of the statement that other persons had been applied to for payment of money who already held receipts of the company. It was true Mr. Powell had made an assertion directly to the contrary, but the evidence of that witness rather showed that the truth was on the side of Booth, who, it was proved, was not, at the date fixed by Powell, in the service of the company. Upon the whole of these facts he (Mr. Woolrych) considered it was incumbent upon him to decide in favour of the company. He looked upon the contract as settling the question. He was not casting the slightest reflection on the respectability of Mr. Denton, to whom it was a most unfortunate affair, nor upon Miss Heald, who appeared to be an intelligent young woman; but, in the face of the contract, he certainly could not accept the application notice produced by the defendant as a discharge of the debt, and it became his duty, therefore, to make an order upon him for payment of the money, with 2s., the cost of the summons.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

PUBLIC LAMPS IN THE CITY OF LONDON.—In the report presented to the Court of Sewers on the works executed in the City during the past year, the engineer, Mr. Haywood, has the following remarks as to the street lighting:—"Tenders were received from the Gaslight and Coke Company, which alone now supplies the City of London, for lighting the public lamps. The price tendered was £6 2s. 6d. per annum for square lamps consuming five cubic feet of gas per hour, and £6 6s. 9d. for the circular lamps. The difference in cost is owing to the increased care and expense of cleaning and maintaining the circular lanterns. The number of defective lights observed during the year was 982, which was 526 less than those observed in the previous year. These returns are made to the commission by the City Police, and include only those lamps in which the defects in lighting are very marked and noticeable. There appears to have been less cause of complaint during the two last years than in previous years. Under the City of London Gas Act, 1868, The Gaslight and Coke Company applied to the Board of Trade to appoint commissioners to revise the illuminating power and price of gas supplied to them during the year 1874, and on the 31st of March the said commissioners certified that they had sanctioned a rise in the price of gas for the year, from 4s. 4d., at which it then stood, to 5s. per 1000 cubic feet, the illuminating power to be equal to 16 candles. The inspectors again report that the lanterns are cleansed twice a week regularly; it would be better, undoubtedly, if they were cleansed three times a week, or more frequently. This was the subject of communication with the gas company during the year, but so large an increase in the price was demanded for the additional cleansing that the commission thought it desirable to take no further steps in the matter at present. The number of public lamps to which meters are attached is 35; these meters show that the contract quantity of gas at those lamps has been given. The district inspectors, as well as the inspector of gas lighting, appear to be of opinion that the contract quantity is given to all the lamps, and the company state that the regulators have been kept in proper condition throughout the year. The commission however, has no power to remove these regulators to test them, excepting under somewhat troublesome conditions, and, therefore, without expressing an opinion as to whether the contract quantity is given or not, it may be stated that, excepting where there are meters to the public lamps, there is no check upon the quantity supplied. Two of Bartlett's patent boulevard lamps were, by permission of the commission, and at the expense of the patentee, fixed at the corner of Ludgate Circus, and eight of them in Cannon Street, between Queen Street and Dowgate Hill. The patentee claims for these lamps that the gas burned in them gives a greater and more diffused light than in the ordinary lanterns, that the reflectors being away from the smoke are not liable to be damaged, and that the globes being in one piece of glass, and without frames, are very easily kept cleam. At the corners of streets these globes have a band about 4 inches wide, ground on the surface, on which the names of the streets are intended to be written, and thus be conspicuous both by day and by night. Mention may be made here of other lamps, to which reference was accidently omitted in my last annual report. In October, 1872, Mr. Skelton, the patentee, was allowed to erect six of his catoptric lamps in Moorgate Street. In December, 1873, he was allowed to place 25 lamps in Cheapside. All these lamps are still in their places. They are 14 inches square, and in general outline not dissimilar to the ordinary street-lamps of London; they are fitted on the two sides which are best seen from the footways, and also on three out of the four compartments of the top, with reflectors formed of slips of looking-glass, placed after the manner of a louvre, and enclosed between sheets of glass, so as to prevent their getting dirty. The faces, both internally and externally, of the enclosure of these louvres offer the same surface for cleansing as the glazing of the ordinary lanterns. The inventor considers that by the use of these lamps a large quantity of light, which is now diffused in space, is thrown by the reflectors on to the public ways. It being thought desirable to try the effect of a ring of gas jets, not enclosed in a lantern, at one of the resting-places in the carriage-way fronting the Mansion House, a ring was erected in the month af April; it has since

been continued, but is intended shortly to be removed, its expense being very largely in excess of that of the five lamps originally there, and it being open to the objection of uncertain light in stormy weather."

METROPOLIS WATER SUPPLY.

Major Bolton reports that during the month of February the state of the water in the river Thames at Hampton, Molesey, and Sunbury, where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London Companies are situated, was generally bad throughout the month. The highest flood state of the river at Hampton during the month was 3 feet 1 inch above the (6 feet) summer level, and the lowest 1 foot 4 inches below. At Seething Wells, Kingston, the state of the water in the river was indifferent on 15, bad on 10, and very bad on 3 days during the month. The heavy floods mentioned in the reports for December and January have continued during the greater part of the past month. While these floods prevail the Chelsea Company are compelled to take in dirty and turbid flood water, in which there is a considerable amount of solid matter, too fine to settle, arising from the chalk and clay carried down by the floods. This is difficult of removal by filtration, being only practically got rid of by long subsidence previous to filtration. The highest state of the flood water at this place was 4 feet 4 inches, and the lowest 1 foot 3 inches above summer level. The highest temperature of the water during the month was 43°, and the lowest 36°, while the highest temperature of the air at the same place was 48°, and the lowest 29°. These observations were made daily at 9 a.m. The rainfall during the month was 1·05 inches. The Kent Company supply to about 600 houses in New Charlton on and after the 1st of May next. A new covered reservoir has been constructed at New Cross, and contains 1,750,000 gallons, to provide for constant supply to Peckham. The water at the intake of the New River Company was generally affected by floods during the month, but the intake was closed while the water was in its worst condition. The Chelsea Company's intake being situate below the filthy outflow of the rivers Mole and Rye, and the company having at present no impounding reservoirs, they are compelled to take in water as they find it day by day, and it is quite impossible for them to effectually filter this water during the time of floods. The directors have been authorized to obtain a fresh intake, with reservoirs and other works connected therewith, and lay the necessary main-pipes from the site of such intake to the works at Seething Wells, with the least possible delay. A bill is now before Parliament for the necessary powers, and should it pass, the new pumping-main will be laid and in use by November next, the floods in the river Mole will thereby be avoided, and the company will be enabled to supply their district with better water during next winter. The directors state that they are confident that when the intended new reservoirs shall have been completed, the quality of the water delivered in their district will be unexceptionable. The reservoirs would probably be completed within 18 months from the passing of the Act. The land, comprising an area of about 50 acres, necessary for the construction of the impounding reservoirs, has been already obtained near Molesey.

WATER SUPPLY FOR PUBLIC PURPOSES IN THE CITY.—From the report of the engineer of the City of London Sewers Commission for 1874, it appears that the amount paid by the commission during the year for water supply was as follows:—Supply to urinals, £467 10s. 11d.; for flushing sewers, £9 1s.; for street watering, £572 15s. 8d.; for washing the surfaces of courts and alleys, £215 15s. 8d.; for drinking fountains, £30 5s. 1d.; for stand-pipes supplied to poor neighbourhoods, £32 10s.; total, £1327 18s. 4d.

BRISTOL UNITED GAS COMPANY.

The Half-Yearly Meeting was held on the 18th inst.—Mr. W. NAISH in the chair.

The SECRETARY (Mr. Townsend) read the following report of the directors for the half year:—

The directors of the company have the pleasing duty of laying before the proprietors the audited accounts to Dec. 31, 1874, which show a balance to the credit of profit and loss of £21,257. This sum will admit of the payment of the full dividend for the half year which is allowed by the Act of Parliament. The amount required for that purpose is £14,562 10s., and therefore the directors are not under a similar necessity to that which existed in the past two years—viz, to draw on their reserve-fund for a portion of the amount.

The improved financial position of the affairs of the company has, of course, been due to the increase on the selling price of gas during the past year, rather than to a reduction in the cost of coals. This advantage has, however, been somewhat counterbalanced by the fall in the value of coke, and by an increase in certain of the manufacturing charges.

It is the intention of the directors, should no unforeseen difficulties intervene, to make a reduction of 6d. per 1000 feet in the selling price of gas on and from the 1st of July next. This will doubtless be a satisfactory announcement to the consumers.

Such extensions and additions to your works as have become necessary in consequence of the increased and still increasing demand for gas have been either completed, or are in course of construction. It will be imperative to consider immediately a further enlargement of the means of purifying the gas made at one, at least, if not both of the stations.

Your directors regret that it has become their duty to report the death, on the 17th of January last, of their esteemed colleague, Thomas Porter Jose, Esq., who had filled the office of a director of the company for many years, and at all times displayed a warm interest in its success.

The directors recommend that a dividend at the rate of £10 per centum per annum on the capital of the company entitled to such dividend be declared and made payable at the bank of Messrs. Cave, Baillie, and Co., Bristol, on and after Thursday, the 25th of March inst., subject to the deduction of income tax.

The CHAIRMAN said it became his duty to move that the report should be adopted, and entered upon the records of the company. He had great pleasure in doing so, because he need hardly remind them that the report for the half year before them stood out in favourable and very pleasant contrast to that of the preceding half year. They were able to report this time that they had honestly earned their dividend for the half year, and they were justified in declaring it on the profits of the half year. It was a long time since they had been in a position to do that—particularly through the very high price of coals, and also the increase in the price of labour, together with iron and other manufactures necessary for gas making. Then they had also had a very adverse contract to contend with—for quite the last three years they had this uphill contract with the city, and they had been obliged to sell the gas at a low price; but they had been bound under that contract, and they had faithfully performed it, notwithstanding they were obliged to do it at the expense of the proprietors, because they could not make their dividends out of the produce of the gas in those half years, and they had been obliged to declare them out of the reserve fund. They were very glad now, however, to find themselves in a rather better position, though they still felt encompassed with difficulties, as they did not at present know what would be the ultimate effect of the lock-out in South Wales, or how long it would last. Notwithstanding that, they were so anxious to keep faith with the public and charge a low price for the gas, that they announced their intention, as was seen in the report, to lower the price on and after the 1st of July next. The chairman next detailed the number of feet of gas they had made in excess of the corresponding half of the previous year. It was satisfactory to know that the gas was increasing in quantity, so as to enable them to sell it at a less price. They would, he need not say, be anxious at all times to do so when they felt they could afford it. They had passed over a time of unexampled calamity, and had suffered from the high prices of coal more severely that many other proprietaries. They had to regret the death of one of their old colleagues—Mr. T. P. Jose—who had attended their meetings year after year. Mr. Jose had always interested himself in the welfare of that company; but they constantly found, as they got older, their old associates and companions fading away from them and falling off. They gladly acknowledged Mr. Jose's usefulness, and respectfully held him in memory.

Mr. F. TERRELL seconded the motion.

Mr. G. WILLS, without wishing to express the slightest doubt as to the gratifying state of the accounts which had been read, regretted that they were not printed and circulated beforehand. He ventured to express a hope that they should make this desired change in the present mode of furnishing the accounts to the proprietors. He must confess that he was wholly in the dark with regard to them. While the secretary was reading them over he began to write some of the items, but he was obliged to leave off. They as shareholders wanted to know a little about their affairs. He felt perfectly sure that the acccounts were exceedingly well kept, and in excellent hands. Still, he should like to see what they were doing.

The CHAIRMAN said Mr. Wills was perfectly in order in making the remarks which had just fallen from him, and doubtless he considered he had good grounds for putting forward the suggestion. But the directors strongly believed they were consulting the interests of the shareholders by merely complying, as they did at present, with the requirements of the Act of Parliament. The proprietors were able for one shilling to get a copy of the accounts, and they felt assured that they would be consulting the interests of the company by leaving the matter as it stood at present. They found that gas affairs were looked upon in a very critical manner, and he would remind them that in a London company some time back some mischief ensued by their adopting some such a course as that proposed. On the whole, he thought it would be much better to leave the matter alone.

Mr. G. WILLS said he was interested in a London gas company, and he found that that company gave the shareholders very full statements of the accounts.

The CHAIRMAN replied that they had had the question brought forward on previous occasions and discussed, and it was always thought better to leave this matter where it was. He then put the motion for the adoption of the report and accounts, and it was carried unanimously.

On the motion of the CHAIRMAN, a dividend at the rate of 10 per cent. per annum, subject to a deduction for income-tax, was then declared, payable on the 25th inst.

On the motion of Mr. G. WILLS, a vote of thanks was given to the chairman and board of directors.

The CHAIRMAN, in responding, expressed a hope that the irregularity in the supply of coal would soon cease, and that in the future they would have more reliable supplies.

The proceedings then terminated.

BIRMINGHAM AND STAFFORDSHIRE GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on Tuesday last—Mr. G. HEATON, deputy-chairman, presiding.

The following report and statements of account were submitted:—

Your directors have the pleasure of submitting the profit and loss account and balance-sheet for the half year ending the 31st of December last, which show a balance in your favour of £16,451 13s. 9d. Out of this sum they recommend the payment of the usual maximum dividends, amounting to £28,207 10s., leaving a balance of £18,244 3s. 9d. to the credit of the next half year's accounts. The increased consumption of gas has necessitated the erection of a new gasholder at Saltley. The sanction of the corporation has been given to the requisite expenditure, in accordance with the terms of the agreement entered into with them. It is hoped that the gasholder may be finished in time for use next winter. The bill now before Parliament, which was approved by you recently at a special general meeting, and which, it will be remembered, contained a confirmation of the agreement for the sale of your undertaking to the corporation, and a provision for additional capital, has been read a second time in the House of Commons. Your directors recommend that the dividend warrants be made payable on the 25th inst.

Dr. — *Profit and Loss Account, Dec. 31, 1874.* — *Cr.*

Coals	£92,069 9 5	Balance brought from last half year's account	£1,562 17 1
Purifying materials and process	1,285 0 10	Amount taken from reserve-fund	26,163 7 11
Repairs and maintenance of meters, mains, service-pipes, and other works	11,645 15 11	Sale of gas, after deducting £10,000 for estimated discounts and bad debts	119,964 16 3
Wages	12,201 7 2	Coke and breeze	36,684 10 0
Lamps (providing, lighting, extinguishing, cleaning, and repairing)	1,474 2 0	Tar and other residuals, and fittings	18,351 1 0
Rates and taxes	2,721 13 6	Rents	95 10 11
Salaries, collectors commission, and payments to directors	5,125 0 3		
Interests on loans and on calls prepaid	687 12 0		
Professional charges and incidental expenses	964 3 6		
Dividends paid to proprietors—viz., 10 per cent. per annum on £320,400., capital raised under Act of 8 & 9 Vict., cap. 66	16,020 0 0		
Seven and a half per cent. per annum on £300,000 for six months, and on £12,500 for two months, raised under Act of 21 Vict., cap. 1	11,406 5 0		
Miscellaneous	469 19 10		
Balance carried forward to next half year's account	46,451 13 9		
	£202,522 3 2		£202,522 3 2

Dr. — *Balance-Sheet, Dec. 31, 1874.* — *Cr.*

Capital raised under Act 8 & 9 Vict., cap. 66	£320,400 0 0	Cost of works, June 30, 1874	£624,986 0 2
Ditto Vict. 21, cap. 1	325,000 0 0	Add extensions made during the half year	14,235 13 7
Ditto Vict. 27 & 28, not bearing dividend	10,986 0 0	Amount invested of the reserve-fund	20,891 16 6
Calls prepaid	16,932 0 0	Calls unpaid	89 0 0
Amount of loans	22,775 0 0	Amount owing to the company for gas, cokes, residual products, fittings, &c. (exclusive of estimated discounts and bad debts)	119,100 17 3
Reserve-fund	21,030 14 2	Coals in stock	13,611 18 0
Amount owing by the company	43,185 4 11	Residual products and other stock	12,982 0 4
Unclaimed dividends	657 3 0	Cash in hands of treasurer and cashier	1,440 10 0
Balance as above	46,451 13 9		
	£807,337 15 10		£807,337 15 10

The CHAIRMAN, in moving the adoption of the report and statement of accounts, expressed his regret that Mr. Sharp was not able to be present on account of serious indisposition. The accounts which had been laid before them were very satisfactory, or of a more satisfactory character than those which were presented at the last half-yearly meeting. The items of expenditure in coals, &c., were much less in proportion than they were, and the amounts received for gas, and the other products of the coal, were much more satisfactory, with the exception of those for coke. As the report intimated, the directors had accepted tenders for a gasholder at Saltley, for the purpose of storing a larger quantity of gas than they were able to do at present, and affording a more abundant supply

than during the past winter. He was sorry that they had no fresh information to give the shareholders with regard to the bills now before Parliament.

Mr. H. WIGGIN seconded the motion.

Mr. WALKER expressed his disapproval of the proposed transfer of the company's works to the corporation on the terms which had been stated, and put a series of questions to the chairman in reference to the report.

Mr. HARDING asked what were the prospects with regard to the reserve-fund? If the works were taken over by the corporation, would the reserve-fund belong to the town or to the shareholders?

The CHAIRMAN said it would not belong to the corporation, but he thought it was rather premature to discuss that question.

In reply to Mr. Walker's questions, the CHAIRMAN said that the diminution of the debenture debt was no doubt very largely due to the calling up of the additional share capital. With regard to the bargain with the corporation, about which Mr. Walker had expressed his opinion, of course as that had been ratified with the shareholders, it was hardly necessary to discuss the question again. There had been an interchange of gas going on for some years past between them and the old Birmingham Gas Company, and no doubt to a small extent it would continue. Where this had been found out they had been met with the greatest courtesy, and in an honourable and straighforward spirit by the other company. The sum of £1504 3s. 4d., on account of the gas which had thus passed from one main to another, was not included in this half year's accounts. Respecting the works, the shareholders might be assured that they were in a proper state of efficiency. The bill in Parliament contained provision for additional capital.

Mr. C. H. ALLISON observed that since 1873 the amount owing to the company for gas had increased from £71,000 to £119,000. That appeared to be a very large amount.

The CHAIRMAN explained that the large amount was no doubt in consequence of the increased price charged for the gas as compared with the corresponding quarters previously. In the second place, it was owing to the larger quantity of gas consumed. The accounts were collected much closer than before.

The motion for the adoption of the report was then carried.

On the motion of the CHAIRMAN, it was then resolved—"That a dividend be now declared at the rate of 10 per cent. per annum on the capital raised under the Act of 8 & 9 Vict., cap. 66; and of 7½ per cent. per annum on the capital raised under the Act of 21 Vict., cap. 1, payable at the bank of the Birmingham Banking Company, Limited, on Thursday, the 25th inst."

A vote of thanks to the chairman concluded the meeting.

BIRMINGHAM GASLIGHT AND COKE COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 18th inst.—Mr. J. T. COLLINS in the chair.

The SECRETARY (Mr. Slocombe) read the following report:—

It is with considerable satisfaction that your directors submit the accounts for the past half year, from which it will be seen that the net profit, added to the balance of £552 13s. 5d. in dividend account, amounts to £17,852 13s. 7d.

Your directors recommend you to apply £14,988, part of this sum, in payment of a dividend, which, added to the amount divided last September, will be equal to the maximum dividends for the whole of the year 1874—viz., 9 per cent. on the A and B shares, and 7½ per cent. on the new ordinary shares, and carry forward the balance, £2864 13s. 7d.

The fall in the value of coke, referred to in the report preceding this, has very materially diminished the receipts from that source. On the other hand, the more favourable contracts for coal have led to a satisfactory reduction in the expenditure.

When the central streets of the town were being recently taken up to lay the wood pavement, several of the service-pipes were found connected to the wrong mains. The statement of gas consumed through these services shows a balance of £1504 3s. 4d. due to the Birmingham and Staffordshire Company, as set forth in the profit and loss account.

The works and mains are in good order.

Messrs. T. Bullock, jun., Edward Davenport, and James Watson, directors, and Mr. George Barrow, auditor, retire at this meeting, and being eligible offer themselves for re-election.

At a special general meeting of the proprietors, held on the 9th of February, the bills, Nos. 1, and 2, promoted on behalf of this company, and now before Parliament, were approved. Both measures are alternative, and will not be proceeded with if the bill of the corporation for the purchase of the two gas companies proves successful.

In conclusion, your directors desire to record their high appreciation of the skill and energy displayed by your chief engineer, Mr. Charles Hunt, to whose untiring exertions and sound judgment the present improved condition of the company's affairs is largely due.

Dr. *Profit and Loss Account, Dec.* 31, 1874. *Cr.*

Management—				Sale of gas, after deducting discounts, adjustments, bad debts, and expenses of public lamps	£59,544	18 8
Office salaries and collectors commissions	£1,646	16 5		Coke and breeze, after deducting labour, expenses, discounts, and bad debts	14,740	17 5
Fees to directors and auditors	460	0 0		Tar, ammoniacal liquor, profit on fittings, and sundries (less discounts)	7,894	4 2
Stationery, book binding, printing, postage and receipt stamps, and incidental expenses	589	4 11		Rents receivable	395	8 9
Manufacture—				Cash discounts on purchases	286	12 1
Coals, including tonnage and delivery	41,696	2 6				
Purifying materials and wages	894	4 11				
Supervision, labour, retorts, tools, and implements, with ordinary repairs	12,271	6 3				
Distribution—						
Ordinary repairs, and maintenance of mains, with costs, repairs, and renewals of services, wages of meter inspectors, &c.	1,585	17 0				
Meters—						
Restoring and maintaining	716	15 5				
Rents, rates, and taxes—						
Rents payable	351	2 6				
Rates and taxes	1,568	7 0				
Law costs & continuous audit	93	17 0				
Interest on loan capital	2,602	8 1				
Bank charges	131	15 7				
Birmingham and Staffordshire Gaslight Company, balance of account due to them for gas supplied by us through service-pipes connected by mistake to their mains	1,504	3 4				
Balance carried to balance-sheet	17,300	0 2				
	£82,812	1 1			£82,812	1 1

The CHAIRMAN, in moving the adoption of the report, said the directors had great pleasure in meeting the shareholders on the present occasion, and in congratulating them upon the improved statement presented of the working of the last six months. The working of the half year enabled the directors to pay the proprietors the full dividend for the whole of the year. It seemed something like returning to old times when the full dividends were more regularly paid. At the same time, the directors felt that they ought to thank the shareholders for the patience they had extended to the directors during the length of time they had paid a reduced dividend. The improved working to which he had pleasure in calling attention did not arise from any large alteration in the accounts, but the items of expenditure were generally less, and they also had an improved income; and it was the balancing of those items that had produced a more favourable result. He thought they had very good evidence that the labour and expenditure which they had thought right to undertake in the improvement of their works, and so on, were bearing good and profitable results. With regard to the item of £1504 3s. 4d., balance of account paid to the Birmingham and Staffordshire Company for gas supplied through mistake, it appeared, when some of the central streets of the town were taken up for the new paving, that some of the service pipes had been attached to the wrong mains. It was a very large item, as the taking of the gas had been going on for a long series of years. They now had their mains laid out in such a way in their plans that he did not think they were likely to have any great amount recurring again, though doubtless small exchanges would occur from time to time. The directors had met the other company, and the other company had met them very fairly, and they paid each other for the gas which they had respectively taken from the wrong mains. He did not know that there was anything special to say with regard to their parliamentary bills; they would come before the committee soon after Easter, and he hoped that parliamentary action, whatever it might be, would place the company in a better and stronger position. With regard to the last paragraph, referring to the services of Mr. Hunt, the directors thought it was due to that gentleman to insert it, since the admirable working of the accounts was very much due to the zeal and energy which he had brought to bear in the management of the works. The directors did not, however, desire to make that public acknowledgment at the expense of any of their other officers, who, especially their secretary, had rendered very valuable assistance in carrying on the company.

Captain BULLOCK seconded the resolution, and said it was a great gratification to the board of directors that their efforts to restore the company to a sound financial position had been so speedily followed by success. Mr. Hunt, their engineer, had certainly worked very hard for the company, and he (Captain Bullock), as chairman of the works committee, could bear testimony to the great skill, industry, and perseverance he had brought to bear in order to put everything connected with their works in the best possible condition. He thought their works at the present time were in as good working order as any in the kingdom. It was mainly to the good order and to the improvements which had taken place in their works that the directors attributed the financial results of the half year. If the shareholders looked at the balance-sheet carefully, they would see that the advance in the price of gas had been very nearly covered by the advance in labour, coal, and other materials, so that the profit had really been made out of the good working of the company, as against the advance in the price of things. He wished to say a word with reference to the question which had been agitating the gas consumers of the town, and which he thought they should notice. He had some figures got out to show the position of that company in the matter. It appeared that in the quarter ending the 31st of December last they made 293,858,000 cubic feet of gas; and they sold, or rather they received payment for, 278,641,500 cubic feet. For the same quarter in 1873 they made 278,894,000 cubic feet, and they sold 257,499,400. From the quantity made they had to deduct what they had consumed themselves, and what was lost in condensation and distribution. If they did that with both items they would find that the cubical quantity of gas in 1874 balanced as nearly as possible with what it was in 1873, so they could say most positively that whatever the bills issued by the company might be they made as much more gas in their works and sent it out as the bills charged extra. With respect to the illuminating power, their gas was tested very frequently indeed, and the directors were not satisfied with their own tests, but Dr. Odling had directions from the board whenever he was in the neighbourhood of Birmingham to call at their works without any previous notice and test the gas, giving them a written certificate as to its quality in all respects. The directors had gone carefully through the books, and they found that they compared well with Dr. Odling's tests. Their engineer did not make the gas out to be better than Dr. Odling made it, therefore they had every reason to conclude that the tests were fair. In the quarter ending December 31, 1874, their gas was 15½ candle, and in the corresponding quarter of the previous year they made 15½ candle, showing that whilst they delivered no more gas than they made last quarter, they did not depreciate in the slightest degree the illuminating power. He thought that must be a satisfactory reply to the general complaints that were made in the town. If he could give any further information he should be very happy to do so. He assured the shareholders and the public generally that the directors had one desire, to give a good quality of gas, and having supplied it, to charge for what the consumers used, and no more. As regarded complaints to that company, he had enquired from the secretary, who had diligently enquired into the matter, and up to Christmas last they had fewer complaints as to the quality and lack of quantity than had been made for many years past; in fact, at Christmas they congratulated themselves that they were giving a better supply of gas, and of better quality, and that their customers were better satisfied than they had been for many years. Since the letter was published in one of the local newspapers, it appeared that they had had some complaints as to bills being larger. Whether through the cold weather or the long winter their customers had burnt more, he could not say. All he knew was they had had the gas, it had been of good quality, and the company had charged them for what they had had, and no more.

Mr. EVERITT congratulated the directors on the position of the company, and hoped that before this time next year the directors would be able to recoup the shareholders to the extent of the old dividend. If such should be the case, and the concern was not merged in the corporation, he hoped the shareholders would vote some accession to the payment to the directors.

Mr. TURNER asked whether the directors contemplated reducing the price of gas during the next three or four months.

Mr. BOLTON said he did not think they should wait till next year to increase the directors allowance, but they should increase it at once.

The CHAIRMAN said that it was too much to hope that they would be able to pay the back dividends in twelve months, but they might perhaps pay half. With regard to the price of gas, they could not make any change in that until the present bills before Parliament were disposed of. Part of their agreement with the corporation was that they should make no reduction in the price of gas until the transfer or otherwise was decided. As regarded the opposition to the corporation bill, the company were pledged loyally to support it. There was certainly a long schedule of opposition from outsiders, but what it would come to remained to be seen; it might melt away, or it might be a considerable matter.

In answer to Mr. W. Williams, the CHAIRMAN said it would require £18,000 to pay the back dividends.

The report having been adopted, the dividends recommended in the report were declared, and the retiring directors and auditor were re-elected.

The usual votes of thanks were then passed, and Mr. Bolton, who was informed that he could not move a resolution at the present meeting, gave notice that at the next meeting, ordinary or extraordinary, of the company, he would move that the payment to the directors should be increased.

The meeting then terminated.

BIRMINGHAM WATER-WORKS COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 17th inst—Mr. W. JAMES in the chair.

The following report of the directors was presented:—

The directors have to report that the water-rental for the last half year amounted to £42,802 4s. 3d., exceeding that of the corresponding half year of 1873 by £2982 3s., and that of the half year ending the 30th of June last by £1366 10s. 4d.; the water-rental for the year ending Dec. 31, 1874, exceeding that of the year ending Dec. 31, 1873, by £9029 19s. 3d.

The profit of the past half year is £25,299 1s. 11d., being more than that of the corresponding half year of 1873, by £6005 18s. 11d., and more than that of the half year ending the 30th of June last, by £2858 14s. 9d.; the total profit of the year ending Dec. 31, 1874, exceeding that of the year ending Dec. 31, 1873, by the sum of £11,864 17s. 10d.

The profit and loss account for the half year ending Dec. 31, 1874, and the balance-sheet of that date, are now submitted to you.

The profit of the past half year—viz., £25,299 1s. 11d., and the previous undivided profit—viz., £927 18s. 11d., make a total of £26,227 0s. 10d. The directors recommend that a dividend at the rate of 8 per cent. per annum upon the paid-up capital comprised in the original £25 shares, the new £25 shares A, and the £18 15s. shares B; and a dividend at the rate of 7 per cent. per annum upon the paid-up capital of the £20 shares C, and the £15 shares D, be this day declared; which dividends will amount to £23,772 6s. 9d., leaving a balance of £2454 14s. 1d.

The directors recommend that the dividends be paid by dividend warrants, to be forwarded to the shareholders on the 25th inst.

The directors also recommend that of the balance of £2454 14s. 1d., above referred to, £2368 19s. 4d. should be appropriated to the making up of the dividends for the half year ending June 30, 1865, and declared September, 1865, from 6½ per cent., the declared dividend, to 8 per cent. per annum, the maximum dividend. This will leave a balance of £90 14s. 9d.; exclusive of £2964 14s. 2d. reserved for extraordinary repairs and contingencies, and for bad and doubtful debts.

The directors recommend that the dividends of 1½ per cent., to make up the deficient dividends above referred to, be paid by dividend warrants, to be forwarded to the shareholders as soon as they can be prepared.

The whole of the pumping establishments, including that at Whitacre, are in good working order, and the wells at Aston, Short Heath, and Perry, continue to yield an ample supply of excellent water.

The works at the Aston well, referred to in the directors last report, will soon be completed.

The whole of the land required for the storeage reservoir at Shustoke has been purchased, and the formation of the reservoir will shortly be commenced.

The sinking at Selly Oak is being proceeded with.

The high-level reservoir at Erdington, by which considerable saving in pumping will be effected, is in course of formation, and will probably be completed during the present year.

The directors trust that the large filter-beds in course of construction at Plant's Brook will be completed by Midsummer next.

During the past half year, 33 fires have occurred within the company's district, and in all cases there has been an abundant supply of water. Thirty of these fires have been extinguished without the use of fire engines, partly by portable engines, and partly by water delivered under pressure from the company's mains; and ten have been on premises not supplied with water by the company. The supply of water in cases of fire is always provided by the company gratuitously.

During the past half year, extensions have been made in the following streets and roads, viz.:—Sandy Lane; Emily Street; Langley Road; Montgomery Street; Herbert Road; Parliament Street; Conybere Street; Claverdon Road; Bridge Street; Ernest Street; Windmill Hill; Lichfield Road; Cuckoo Road; Long Acre; Hutton Street; Church Road, Aston; Gate Street; Parker Street; St. Augustine Road; Woodbourne Road; High Street and Park Lane, Harborne; Stamford Road, Handsworth; Vicarage Road, King's Heath.

Messrs. David Malins, Samuel Thornton, and Henry Wiggin, retire from the board of directors this day, by rotation, but are eligible for re-election. The secretary has received notice of the nomination of these gentlemen for re-election, pursuant to the resolution passed at the half-yearly meeting of the shareholders held on Sept. 21, 1864.

Mr. James Atkins retires from the office of auditor, this day, by rotation, but is eligible for re-election. The secretary has received notice of the nomination of this gentleman for re-election, pursuant to the resolution passed at the half-yearly meeting of the shareholders held on Sept. 21, 1864. In consequence of the lamented death of Mr. Charles Rogers Cope, for many years an auditor of the company, the shareholders at the ensuing meeting may, if they think fit, appoint a proprietor to fill the vacant office for the ensuing year; and the secretary has received notice of the nomination of Mr. James Tertius Collins for election.

Your directors fully recognize the importance of the proceedings in Parliament recently instituted by the council of the borough, for the compulsory transfer to the town of the property of the company; and assure you, that they will shrink from no amount of trouble in guarding your interests. As, however, this subject is one which cannot be prudently referred to further in this report, or discussed at the approaching meeting, the directors trust that the confidence which the proprietors have so long reposed in them, in the general management of the affairs of the company, will be extended to them in this matter.

A form of proxy is enclosed.

Dr. *Profit and Loss, Dec. 31, 1874.* *Cr.*

Wages current	£1,034	5	4	Water-rents	£42,802	4	3
Salaries	1,687	0	3	Rents of land and cottages	437	10	9
Working engines, and wages	7,545	8	1	Fittings account	548	2	4
Repairs of works	1,307	19	1	Transfer fees	14	0	6
Coals for offices	28	6	6				
Rates and taxes	1,296	6	4				
Interest	3,973	16	5				
Incidental expenses	374	2	1				
Law charges	38	7	0				
Abatements and bad debts	707	7	10				
Remuneration of directors	450	0	0				
Remuneration of auditors and accountant's charges	39	17	0				
Balance, being profit from June 30, 1874	25,299	1	11				
	£43,801	17	10		£43,801	17	10

The report having been adopted,

Mr. TURNER asked for some statement from the directors as to the probability of the undertaking passing into the hands of the corporation. There was a strong impression abroad that it was the intention of the directors to resist to the utmost of their power the disposal of the water-works to the corporation. He could not help thinking, however, that the time had come when it was right that the water-works should pass from the company to the corporation. He thought all large corporate bodies ought to supply their districts with water.

The CHAIRMAN said the only answer he could give was that the shareholders must rest satisfied that the directors would take every legitimate means in their power to protect the interests of the shareholders. He had always taken a deep interest in the company, and believed he had the confidence of the directors and the shareholders, and he hoped, therefore, that the shareholders would rest satisfied that the directors, individually and as a body, would do everything they possibly could to protect the interests of the shareholders. He would give Mr. Turner the advice which a noble lord once gave to his friends: "Rest and be thankful."

The dividends as recommended in the report were formally declared, and the retiring directors and auditors re-elected, Mr. Collins being appointed in the place of Mr. Cope, deceased.

A resolution was adopted increasing the salary of the secretary (Mr. Starkey) from £600 to £700 per annum.

A cordial vote of thanks was given to the directors, and it was resolved—"That the portrait of the chairman, which has been painted in accordance with the resolution passed at the last general meeting of the proprietors of this company, be presented to Mr. James."

Mr. JAMES said he was much obliged to them for the compliment which they had thus paid to him. As long as the water-works company existed he would take care that the portrait should hang in that room.

The proceedings then terminated.

NEWINGTON (NEAR HULL) WATER-WORKS COMPANY.

BOARD OF TRADE INQUIRY.

On Thursday, the 14th inst., a Board of Trade Inquiry, under "The Gas and Water Facilities Act, 1870," was held before Captain TYLER, consequent upon an application by the above company for a Provisional Order to supply water to Newington and Cottingham.

Mr. WEBSTER, Q.C., and Mr. C. J. TODD appeared for the promoters; and Mr. ROBERTS, the town-clerk of Hull, appeared on behalf of the Hull Corporation to oppose the application.

Mr. ROBERTS, at the outset of the inquiry, said he should like, so as to put himself in perfect order, to raise a point already raised before the Board of Trade—viz., that by appearing there that day he might not waive any rights the corporation might be entitled to, if they had such rights, and that was with regard to the question of how far the Board of Trade had jurisdiction. He neither expected nor desired to stay the hands of the commissioner, but he wanted it to appear on his notes. By the Gas and Water Facilities Act, 1870, sub-section 2, power might be given by the Board of Trade to construct water-works and works connected therewith, to supply water in any district where there was no existing company, corporation, body of commissioners, or persons empowered to construct such works and supply water.

Captain TYLER said they might take it that the town-clerk's appearance there would not prejudice the corporation, and they had better proceed with the inquiry.

Mr. WEBSTER stated that the commissioner was thoroughly acquainted with the salient points of the controversy between the parties, and he would do his best to shorten the inquiry by entering into it somewhat fully, because the strength of his case, in his humble judgment, lay not in the evidence, except to prove that which were, or must become, admitted facts. Mr. Webster pointed out, upon a map in the possession of the commissioner, the districts of which he was about to speak, dealing first with the works at present existing in the neighbourhood, commencing with the pumping stations of the Hull Corporation at Stoneferry and Springhead. Besides these, in Newington, a gentleman whose name would no doubt be brought forward—Mr. Garbutt—had erected water-works. At that place there were already erected a pumping station, where there were two engines, two bores, two sets of boilers, and two separate water reservoirs at a very high elevation, and from that place at present supplies were going on and being made to the districts of Newington and Cottingham under circumstances he would have to detail. Having pointed out the geographical position of the various works, Mr. Webster proceeded to notice the state of things chronologically. The powers under which the Corporation of Hull supplied water existed long previously to 1843, and prior to that year they supplied it from springs at Springhead. In that year they got power to make the Stoneferry Water-Works, thus abandoning their old supplies and relying upon the River Hull. The supply was drawn from the river at low water, and there was not the slightest doubt the downflow of water was very much contaminated by the sewage from Driffield, Beverley, and other places. In 1860 the corporation, who had no doubt been doing their best for the people of Hull, found out that that state of things would not do, and they determined on making bores at Springhead, subsequently taking up water from the chalk, and using that for the supply of Hull. At Springhead they erected expensive works, and from that place the water was sent in mains to Stoneferry, where it was collected in reservoirs, and again pumped out into the town of Hull. To pump water from Springhead, to Stoneferry, and then into the town, he thought would be conceded was a grand mistake, for it was pumped a distance of five miles for the purpose of taking it into the town, when it ought to be taken direct to the inhabitants. With regard to the water supply of Newington and Cottingham, was the Corporation of Hull in a position to supply those districts? and was Mr. Garbutt and the gentlemen associated with him, who had gone to great expense, to be prevented from doing that which the Hull Corporation were not willing to do? Mr. Webster then went into detail as to the water supply, more particularly since 1872, and referred to an agreement between the Hull Corporation and the Cottingham Local Board for a supply of water to a certain part of Cottingham. They would only supply water at a charge of 1s. 6d. per 1000 gallons, which the Newington Company were willing to supply it at 9d. In the district of Newington there were 1200 houses built or building, roads had been laid out in the most perfect manner, and taken to by the local board, and an immense expense had been incurred, and the neighbourhood was developing with a rapidity which could only be attained when the thing was done with the energy and spirit with which it had been done. The charge of 1s. 6d. per 1000 gallons for water in the district of St. John's Wood and Newland was almost prohibitive, and the supply was only for about five hours per day, even at that exorbitant charge. He would like to tell Captain Tyler how the water got there. It was sent from Springhead to Stoneferry, pumped through the town of Hull, sent back up Beverley Road, and then passed through the meter for the use of the district of Cottingham.

Captain TYLER: It is taken to Stoneferry pure, and brought back damaged.

Mr. WEBSTER: I am not taking this from my own side, although they have been anxious to get a direct supply, because they knew it was damaged.

Captain TYLER: It seems a most monstrous thing that the water of a town should be taken to a place to be damaged. It is a state of things almost incredible.

The TOWN-CLERK: I am not accepting all Mr. Webster says, though I am not sorry to hear your observations upon it.

Mr. WEBSTER further addressed the commissioner, referring again to the unreasonableness of the corporation's charge for water, and protesting against the idea of the Hull Corporation having any monopoly in the chalk from which the water supply was drawn. He contended also that the corporation had failed to afford a proper supply of water to the inhabitants of Hull, and they were not in a position to supply the rapidly growing districts of the promoters of the Provisional Order. The charge in those districts by the Hull Corporation had been so high that it had checked the growth of the neighbourhoods, but now that there was a prospect of a good and cheap water supply they were being rapidly developed.

Mr. *J. Oldham*, C.E., chairman of the Cottingham Local Board, was the first witness called for the promoters. He bore out fully what Mr. Webster had stated with regard to the high charge for water, the intermittant character of the supply, and stated that complaints were frequently made as to the quality. In cross-examination he admitted that the supply was continued by the Hull Corporation until it was cut off by the Cottingham authorities themselves, and he was unable to name any particular person who had made a complaint as to the quality of the water, or the date when any such complaint was made.

Mr. *G. B. Stephenson*, collector to the Cottingham Local Board, proved that the amount collected for water in the district was less than the amount paid to the Hull Corporation for it, the deficiency having to be made up out of the rates. They dare not charge sufficient to prevent a loss, as the rate would have been most exorbitant.

Mr. *R. Beil*, solicitor to the board, and Mr. *Waddington*, chairman of the Water Committee, gave evidence as to the cost of the mains, &c., laid in the Cottingham districts, and of the borrowing of £1500 for the purpose.

Mr. *D. P. Garbutt* was also called. He gave evidence as to the rapid growth of Newington, and stated that what first induced him to erect water-works for the supply of Newington was the exorbitant charge of the Hull Corporation for water. The works cost him, he supposed, about £35,000, and he sold them to the company for £52,000. He was the managing director of the company. In cross-examination by Mr. ROBERTS, Mr. Garbutt stated that he was the holder of £50,000 in shares, and the other persons named in the articles of association or in the minute-book held amongst them the remaining £2000. It was true they had not paid for their shares, and that there was no written document binding them to do so, but they were gentlemen who would pay the amounts for which their names had been set down, and they would have paid before now had the scrip been signed. They were now in course of signing. He was not the company, and would be glad to dispose of his shares to Mr. Roberts or any other gentleman who would purchase them. The undertaking was thoroughly *bonâ fide*.

Mr. *Jubb*, collector for Newington, and Mr. *George Bohn*, C.E., also gave evidence.

Mr. *Charles Johnson* said he was a land agent and auctioneer at Hull, and he was chairman of the Newington Water-Works Company. He was most cer-

tainly to pay for his shares in the company, and the £2000 was certainly to be paid to Mr. Garbutt. He knew that the supply of water by the Newington Company in the two districts named had tended to the success of building operations. In cross-examination, witness said he had nothing to do with arranging the price to be paid to Mr. Garbutt. As soon as the certificates were ready everybody who had agreed to take shares would pay. As far as he was concerned, there was an obligation to pay for the shares, for he had signed a document to do so.

At the conclusion of the evidence, Mr. WEBSTER and Mr. ROBERTS addressed the commissioner, who agreed to visit the districts referred to in the inquiry, on the following day.

On the following day, Captain TYLER, in company with representatives of the promoters and the corporation, visited Newington, Springhead, and Stoneferry.

POTABLE WATER AND ITS CONTAMINATION IN HOUSE CISTERNS.

By M. M. PATTISON MUIR, F.R.S.E.

[A Paper read before the British Pharmaceutical Conference.]

Last year I communicated to the conference the results of certain measurements of the action of sewer gases upon water supplied for domestic purposes. From these measurements, I inferred that water which comes through the ordinary dwelling-house cistern contains a considerably larger amount of nitrates than water which is supplied directly from the main-pipe. As this inference was drawn from an examination of but two samples of water, I have deemed it proper to extend the investigation, so as to arrive at results which may be of more general application. The samples have been so selected as to secure the examination of typical waters. Some of these samples have been taken from large and well-situated dwelling-houses, others from middle-class houses, while others have been supplied to me—through the kindness of the sanitary inspector of Glasgow—from houses occupied chiefly by the lower classes, and situated in the more crowded parts of the town.

The results of the examination are given in the form of a table; all the quantities being stated in *parts per million* of water, which is equal to *milligrams per litre*.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.	No. 10.	No. 11.	No. 12.
Free ammonia...	·005	·085	·025	—	·015	·015	·010	·035	·015	·075	·20	·045
Albumenoid ammonia.....	·092	·120	·080	·082	·090	·080	·085	·085	·070	·065	·370	·090
Nitrogen as nitrates & nitrites.	·309	·463	—	·321	·360	·20	·258	—	·284	·306	·414	—

No. 1. From main-pipe. No. 2. From cistern in same house; in this house the cistern water is very little used. No. 3. From cistern in house similar to No. 2, but water generally used. No. 4. From pipe leading directly out of the bottom of cistern in well-situated dwelling-house. No. 5. From cistern in smaller dwelling-house. No. 6. From small cistern, supplying part of a house only. No. 7. From public well, supplied with Loch Katrine water from a wooden cistern closed at top. No. 8. From cistern situated just under the slates in a house in a lower locality than the preceding houses. No. 9. From cistern over water-closet in a dwelling-house. No. 10. From cistern similar to last. No. 11. Taken from same cistern as No. 9, but after stirring up the muddy deposit at the bottom. No. 12. From cistern near the slates, in a house where there had been two cases of fever, and where the water was complained of.

Omitting for the present No. 11, it is found the No. 2 sample shows the highest numbers for free and for albumenoid ammonia, also for nitrates. Now this sample of water was taken from the cistern of a house in which the pipes have been recently entirely renewed, and in which the pipe leading from the water-closet to the main drain is thoroughly ventilated. The water in this cistern is, however, very rarely used; for all domestic purposes, a supply is obtained directly from the main; it would, therefore, appear that sewer gases are slowly absorbed by water stored in such a cistern.

That this absorptive action must take place slowly, is evident if we look at the results obtained from the other waters. Although many of these waters were taken from badly situated cisterns, yet in none of them can the influence of sewer gases be distinctly traced. We must, therefore, conclude that the rapidity with which the water in the cisterns has been changed has prevented any appreciable action of the gases upon these waters. There are, it is true, slight variations in the numbers obtained, but in no case do we find a notable increase, as compared with water from the main-pipe. The general conclusion to be drawn, therefore, is, that cistern waters are not, under ordinary circumstances, contaminated with sewer gases; but that, if the water remains undisturbed for a considerable length of time in the cistern, it may become so contaminated, but that, even in such a case, the amount of contamination is inconsiderable

House cisterns, certainly, soon become dirty, and, when they have been used for some time, a deposit of mud or slimy matter is found at the bottom.

The amountof ammonia, &c., obtained from a sample of this slimy matter (diluted with the water itself, No. 11), indicated that a great part of the ammonium alts, &c., is concentrated therein; this matter may, therefore, perhaps exercise sacertain beneficial effect upon the water.

It may be objected to these results, that a greater or less amount of free and albumenoid ammonia is no proof of the absorption of sewage gases by water, and that, even if these gases are absorbed, their presence will not be indicated by a variation in the amounts of the two ammonias.

In order to test the accuracy of such an objection, the following experiment was performed. A quantity of distilled water, free from ammonia, was placed in a porcelain basin, which was covered with porous paper, and suspended at a short distance above the liquid in a sewer.

Through the kindness of the master of works of Glasgow, I was enabled to conduct this experiment in a sewer which receives the refuse of a very large area, chiefly occupied by dwelling-houses. The basin was suspended during 96 hours, after which time the free and albumenoid ammonia in the water was estimated with the following results:—

Free ammonia = ·60 milligram per litre = parts per million.
Albumenoid = ·54 " " = " "

Such a water as this would be at once condemned as largely contamired with sewage. These results show, therefore, that the water has absorbed a large amount of nitrogenous organic matter; and further, that the exposure of water to the action of sewer gases does very decidedly alter the amount of free and albumenoid ammonia obtained in the analysis of the water.

The conclusions to which these measurements led me are, therefore, these:

1. That sewer gases are absorbed by water, and that their presence is rendered evident by an increase in the amount of free and albumenoid ammonia, and also of nitrates, obtained from that water.

2. That this absorption takes place slowly.

3. And that in ordinary cisterns the water is not contaminated to any extent with sewer gases, probably because of the short time during which this water is allowed to remain in the cistern, and also perhaps because of the deposition of part of the impurities in the muddy substance which settles at the bottom of the cistern.

[Our readers who remember a paper by the author on the same subject, which was published in Vol. XXIII., p. 180, will see that a larger number of experiments has somewhat modified his views.—ED. J. G. L.]

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The iron trade is quiet, but, on the whole, has rather more employment than has lately been the case. At many of the merchant iron-works there is a very fair production of bars and plates, for the most part on local account, there being now, also, a tolerably well-sustained demand for constructive iron-work.

At the leading foundry establishments a steady business is still being transacted. There is a very encouraging production of large-sized pipes, from 12 to 26 inches in diameter, for water-works purposes, as well as others of much larger calibre, which are required for gas-works extensions and improvements at several of the larger Yorkshire towns. Irregular castings—reducing-pipes, collars, bends, &c.—are in considerable request, owing to the great alterations of the modes of supply occasioned by the adoption of the constant supply system in numerous places where it had not previously been in force. The great number of streets recently built in the outskirts of not a few boroughs has also had a tendency in the same direction.

A good inquiry is still being experienced by the brassfounders of Rotherham and Sheffield, the chief firm in the former town being yet well supplied with orders for all kinds of ordinary brassfoundry goods, as well as for its *spécialités*.

The coal trade continues quiet, particularly as regards manufacturing fuel. Ordinary steam coal is readily obtainable at 6s. to 8s. per ton, but the best qualities in that class of fuel still command 11s. 6d. to 12s. per ton. Now that the miners wages reduction is an accomplished fact, it is expected that the coal-owners cannot do other than lower the price of fuel by 2s. to 3s. per ton. The secretaries of the Miners Association have issued a temperately worded circular to the men, asking them to abide faithfully by the decision which has been come to, to accept a reduction of 10 per cent. from the second pay day in April (no further reduction to be made for four months). Several large contracts for steam and gas coal have been placed locally within the past few days at decidedly lower figures than those recently current.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The iron trade of this district remains in a very unsatisfactory condition As a rule, the mills and forges are now only maintained in partial production and specifications are growing increasingly scarce. Quotations are unchanged. Indeed, it seems that prices have already receded to the lowest practicable limit, and yet most of the orders which are being distributed find their way into the rival districts of the north country, so that there is little prospect of an improved state of things here until the better class of fuel which is chiefly used in iron making shall be declared lower. But, happily, there are now indications of a revision of prices of thick coal on the Dudley side of the district, and it is considered probable that a reduction will be made before the close of the current quarter, for many of the thick coal collieries are only in partial operation, in consequence of the decreased consumption of fuel by the adjacent iron-works; and it is now quite clear that, if the present price list is maintained, the entire stoppage of many of the pits or heavy accumulations of stock will be the immediate result.

Sheets, hoops, and plates continue to be the leading features of inquiry, but buyers are very cautious, and order only to meet pressing requirements. Pig iron is naturally in failing demand, and prices are—For cinder pig, £3 to £3 7s. 6d. per ton; part mine, £4 to £4 2s. 6d., hot blast; all mine, £5 to £5 5s.; and cold blast £6 10s. Foundry iron is in moderate request, most of the iron foundries of the district being in well-sustained operation, with prospects of continued activity.

Since last report an attempt has been made to settle the unfortunate dispute in the tube trade at Wednesbury, but without success. The men on strike have again duly received their usual weekly allowance of strike pay, at the same rate as the last distribution; an increased sum might have been allowed, there being a balance of £45 in hand, but it was thought that the near approach of the Easter holidays warranted the husbanding of their resources. Substantial help continues to flow in from other districts. At Stourbridge the producers of fire-clay goods experience the full average demand which is usual at this season of the year. The average price of gas-retorts is 4s. 6d. per foot; 9-inch bricks are quoted 60s. per 1000; and cement clay, 10s. to 12s. per ton.

The South Staffordshire Mines Drainage Commissioners are now making rapid progress in the Bilston division of their district, and have given notice for a rate of 3d. per ton on all minerals raised within the comprised area during the twelve months next ensuing.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

In the Manchester district there is no change to report, so far as the best classes of coal are concerned. For all descriptions of house coal there is still good demand at full rates, and good qualities of steam coal as well as the better descriptions of burgy meet with a ready sale. For best slack there is an active inquiry from brickmakers, but inferior qualities are a perfect drug. Gas coal has been rather dull, consequent upon the turn of the season. The average pit prices in the Manchester district are about as under:—Best house, 15s.; seconds, 12s. to 13s.; furnace coal, 11s. to 12s.; best brickmaking coal, 11s. to 12s.; best burgy, 7s. 6d. to 8s.; best slack, 5s. 6d. to 6s.; common slack, 4s. 6d. to 5s., and fine slack 4s. per ton; cannel, about 22s. 6d.; screened gas coal, 14s.; unscreened, 10s. to 11s.; best gas nuts, 10s. to 11s., and common gas nuts about 1s. per ton less.

In the outside districts there is not so much pressure, but still there is a fair demand for round coal. In the poor qualities, however, there is a manifest downward tendency in prices, which will in all probability lead to a definite reduction in the list rates before long.

The Liverpool trade is only moderate, with supplies plentiful, and although good classes of steam coal are quoted at 13s. to 14s. per ton alongside, there is no expectation of maintaining these prices when the South Wales lock-out is at an end. Shippers have been very much inconvenienced by the scarcity of vessels, owing to the long prevalence of East winds, and there has been considerable difficulty in executing even the comparatively small number of orders that are on hand.

The strike at the Atlas Locomotive Works, Manchester, continues; and as both masters and men maintain a very determined attitude, there is not at present any probability of its being brought to a close.

The iron market continues very quiet, scarcely a transaction of importance having been reported during the past week. Prices are merely nominal, because buyers will not give them, as they are anticipating a reduction, and it is scarcely likely that there will be any buying until the result of the quarterly meetings can be known. Founders are complaining of a want of orders, and the forges are only moderately employed. Quotations are about as under: No. 3 foundry pig iron delivered in this district, 67s. 3d.; No. 4, 65s. 9d.; and No. 4 forge, 64s. 9d. per ton net cash. Manufactured iron is very flat, and for good orders a reduction of 2s. 6d. per ton on the list prices can be readily obtained. Bars are worth about £8 15s. per ton delivered. The lock-out in South Wales is tending to keep rails rather firm, and they remain about the same as last quoted.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of the North of England remains exceptionally dull, and it is difficult to explain why it should keep in this condition so long, except that the merchants are "bearing" the markets with the expectation that by doing so they will cause prices to fall. But for the lock-out in the South Wales district, which has brought a limited amount of trade to the Tyne, the Northumberland steam coal trade must have been in a miserable condition. Even with the orders that have come into the trade from thence, many of the northern collieries have scarcely wrought half time. More discount has to be given to make business. But the quoted prices remain the same. Official quotations in this trade will most likely hang out so until the latter part of April, when the Baltic ports will be open, and no doubt a great deal more fresh trade will be brought, which will be the means of cutting down discount pretty considerably. There is a continued falling off in the shipment of household and gas coals from the Tyne Dock, and very few vessels were loading gas coals at the staithes on the Tyne on Saturday.

The award given by Mr. Rupert Kettle in the Northumberland coal trade determining the rates of wages to be paid to the men has given very great satisfaction. The arbitration in the Durham coal-field will be commenced with this week. Coasting vessels are scarce in the coal ports. Rates are firm, but there is no great demand for tounage. Loading turns are ready. Prices remain unchanged officially; but where ready ships are offered, arrangements for loading and prices are easily made. Business to the Baltic continues to open very quietly. The Mediterranean outward business is tolerably firm.

The Cleveland iron trade was again a little more firm last week. There have been considerable shipments to Scotland, and a somewhat improved inquiry for the Continent. This might have been expected with a prospect of the ports of North Europe reopening very speedily. The finished iron trade is rather low, but a more hopeful view is taken of its prospects. The price of manufacturing coal is some 5s. 6d. to 7s. 6d.; small steam coal, 3s.; and coke, 15s. to 17s. per ton, according to quality.

The long strike in the two large chemical factories on the Tyne will be brought to an end, by the points in dispute being referred to arbitration. Mr. Lloyd Jones and Mr. John Burnett have been chosen by the men to act on their behalf, and Mr. Pattinson and Mr. Bell by the masters. The trade has improved. The shipments have increased, and prices have risen in some instances in the chemical trade. A fair quantity of fire-clay goods and bricks are being shipped from the Tyne.

A good deal of gas extension is likely to be gone on with in the towns of the North of England during the summer months, on account of the large increase of the population. The directors of the principal gas-works in the district have now issued their annual reports to the shareholders, and the results are tolerably satisfactory. The last which has been published is the Tynemouth Gas Company's report, wherein the directors announce a dividend of 10 per cent. to the original shareholders, and 7 per cent. on the new stock. Some of the local boards are likely to oppose the progress of the East Northumberland Water Company's bill through Parliament.

TRADE NOTES FROM SCOTLAND.

FROM OUR OWN CORRESPONDENT.

The Glasgow Gas Corporation *employés* have adopted the practice of holding an annual festival, and as it is usually attended by a number of the leading members of the Town Council, as well as by the heads of departments, it is made the occasion for some remarks upon what is popularly called the "gas question." Such a meeting was held last Tuesday evening, presided over by the Lord Provost. Mr. Treasurer Miller, who was one of the principal speakers, remarked that they were all desirous that Glasgow should be enlightened to the utmost possible extent, and at the cheapest possible price, but that was rather a difficult matter at the present time. He did not know how it was, but everybody was complaining about bad gas, and they would be able to say whether the people had good grounds for complaining. A great many people were also complaining that they were charged for far more gas than they burned. That was a problem which was difficult to solve. He knew that if everybody was burning more gas than they formerly did, there was no more gas being made. People also accused them of tampering with the meters, but he thought the most satisfactory way to solve the difficulty would be for people to learn to read the meters themselves, and they could at once perceive whether or not they were overcharged.

The complaints about bad gas at Greenock have just been made the subject of a long report to the Police Board of that town by Provost Neill. The matter had been remitted to two local analysts, Messrs. Cowan and Biggart, and the result was that the gas was found to be equal to 27·92 candles, being three candles greater than the standard required by Act of Parliament. The manager, Mr. Stewart, had previously reported its illuminating power to be 28 candles, and the Provost considered it satisfactory to find that they were getting that illuminating power, and he hoped it would be continued. He also read a statement as to the various kinds of coal that had been tried, and the prices and the proportion of gas obtained from the different qualities. It has been resolved by the same board to charge the gas consumers 1s. 6d. for having their house meters tested, if found correct.

Grumbling about the price of gas is now showing itself in Edinburgh, great surprise being expressed that the price should remain so long unreduced, while coals have gone down many shillings per ton since the last trifling reduction was made, now many months ago. It is suggested that the gas companies of Edinburgh and Leith should be well able to give the public good gas at 4s. 6d. per 1000 cubic feet, instead of 5s. 8d., which is the price now charged.

The advertisement in connexion with the vacant managership to the Blairgowrie Gas Company has brought out no fewer than 59 applications. These have been under consideration during the last few days, and a list of 11 has been made for iurther consideration.

The works in connexion with the Moorfoot water scheme for the city of Edinburgh and adjacent towns are now making considerable progress. The contractor for the Gladhouse reservoir—Mr. W. Mackenzie, Edinburgh—has upwards of 80 men engaged on that contract, and now that the season is opening, that number will shortly be increased to 200. Its extreme length will be upwards of 6000 feet, and its extreme breadth about 5000 feet; its superficial area 363 acres; and its storeage capacity 236 million cubic feet. A second contract will embrace the section of the conduit extending from Gladhouse to Edgelaw. It has been let to Mr. Young, Glasgow.

The Burntisland Police Commission have just sanctioned a further outlay of money on their water scheme, which has already cost so much and yielded so little. On the recommendation of their engineer, Mr. Sang, of Kirkcaldy, they have ordered a bore to be made in a nearly vertical direction from the inner end of the mine on the Bin Hill, with a view to penetrate to a water-yielding stratum which the mine has proved too low to reach within a reasonable distance. The commission have also received a joint report from their engineer and Mr. Landale, to the effect that the limestone deposit opened up by their water-works is of great value. The Dour scheme is at the same time still under consideration, and the water is being gauged.

A bill is at present being promoted in Parliament for a water supply to Busby, an important manufacturing village to the south of Glasgow, but an unreasonable opposition has sprung up against it; and in order to checkmate it, the promoters have just closed up a number of wells from which the opponents tenants have hitherto been supplied. This may bring the opposition "to buy."

The price of pig iron has fallen very sensibly during the past week. As low as 72s. 1½d. was taken on one or two days for warrants; on Friday, however the market closed very firm at 72s. 9d. All the makers special brands have been reduced, in some cases as much as 2s. or 2s. 6d. per ton.

Coal is still less firm in price, and the demand has considerably fallen off.

POOLE GAS-WORKS.—Considerable extensions are to be made forthwith on these works, including a new gasholder, 80 feet diameter, and cast-iron tank. The plans and estimates of Messrs. Willey and Ford, gas engineers, of Exeter, have received preference, and been accepted for the erection of the works.

LEEDS CORPORATION GAS-WORKS.—The vacancy in the office of engineer to these works, occasioned by the death of Mr. Charles Smith, was filled up on the 11th inst., by the appointment of Mr. Henry Woodall, late manager of the Longport Gas-Works, and brother to Mr. Corbett Woodall, of the Phœnix Company's works, London.

THE LIVERPOOL GAS COMPANY AND THE CORPORATION.—On Wednesday last a meeting of the Municipal Gas Committee was held—Dr. Cross in the chair—when a letter was read from Mr. Garnett, secretary to the gas company, stating that the directors had instructed their engineer to co-operate with the borough engineer in testing the quantity of gas consumed by a sufficient number of public lamps to afford a reliable test of the quantity consumed per hour. In accordance with this letter, the borough engineer arranged with Mr. King, the engineer of the gas company, to have the necessary tests, and the result was stated in the conclusion of the engineer's report, as follows:—"Out of the number of 99 lamps tested in conjunction with Mr. King, it appears that the quantity consumed by 44 is below the standard; and, although the mean quantity consumed by all the lamps is slightly above the standard, this result is attained by a pressure of 0·841 inches of water, which greatly exceeds the pressure at which the maximum illuminating power would be given. Under section 4 of the contract between the gas company and the corporation, the company are bound to supply 4 cubic feet per hour to each lamp; and it does not appear to the engineer that this requirement is complied with, even though the average consumption rather exceeds 4 feet per hour, when so large a proportion of lamps are below the average. The attention of many authorities has recently been drawn to the omission in the gas Acts of all reference to the pressure at which the standard quantity is to be burned in the public lamps. It is obvious that this is a most important element; and the authorities for St. Pancras (London), Bootle, and other places, have adopted regulators on each lamp, in order to ensure the stipulated quantity being given under the most favourable pressure, which is almost always below that in the mains. There can be no doubt whatever that the increase of illuminating power given by this means is very considerable, while the companies would probably on the whole profit from the change." On the suggestion of the town-clerk, it was resolved to send a copy of the engineer's report to the gas company. The chairman next expressed his intention to submit to the committee the following resolution—"That the committee on gas supply consider it necessary that the books of the gas company be examined, and that an accountant, entirely unconnected with the company or the committee, be appointed to that office, with the company's consent." Mr. Beloe: Have you any reason to think that the company will consent? The Chairman said he did not think they would consent. Mr. Beloe said they could not carry out the object of that resolution without the company's consent. No doubt the company had spent an enormous amount of capital unnecessarily, and an accountant might be employed at great expense to examine the books, but it was difficult to know what be was to point out to the committee. From his(Mr. Beloe's) inquiries into the company's deposit account, he must say he did not consider that account such an objectionable feature as some people seemed to think it. The deposits in the hands of the company on the 30th of June, 1873, were £31,970. During 1874 they received £13,260 more, making a total of £45,230. But in the year 1874 they repaid £10,406, leaving the total balance in their hands £34,824, which was not so very great an amount when the innumerable changes of tenancies with which they had to deal were considered. The only object the company had in exacting deposits was to prevent a large number of bad debts, and in this way the consumers were benefited, because if there were many bad debts the consumers would suffer. Out of an income of £367,000 in the year 1873 there was only £371 of bad debts, and out of an income of £409,000 in the year 1874 the bad debts only amounted to £480. The system of requiring deposits was adopted in other places in the town, and he considered it strictly equitable. He agreed with the chairman (Dr. Cross) in almost all the points he raised in his able speech in the council, but, with regard to the deposit system, he thought that that might be left alone. The resolution was not pressed by the chairman, who intimated that he would put it on the notice paper for the next meeting of the committee.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

930.—FINDLAY, J., Glasgow, and JACK, W., West Calder, "Improvements in the destructive distillation of coal, shale, and other bituminous substances, and in the apparatus or retorts employed therefor." March 12, 1875.

938.—COOK, H. W., Essex, "Improved apparatus for pumping or exhausting liquids or gases and forcing fluids." March 13, 1875.

943.—TOMEY, J., Warwick, "Certain improvements in water-gauge glasses." March 13, 1875.

950.—COOKE, J., Durham, "Improvements in the construction of rotary engines and pumps." March 15, 1875.

965.—MORGAN-BROWN, W., Southampton Buildings, London, "Improvements in apparatus for the evaporation or concentration of fluids at high or low temperatures with or without the application of a current of air or steam." A communication. March 16, 1875.

GRANTS OF PROVISIONAL PROTECTION.

693.—STORER, J., Birmingham, "Improvements in water-closets." A communication. Feb. 25, 1875.

761.—LAKE, W. R., Southampton Buildings, London, "Improvements in apparatus for regulating the flow of gas, steam, or air." A communication. March 2, 1875.

770.—CLARK, A. M., Chancery Lane, London, "Improvements in gas-meters." A communication. March 2, 1875.

775.—GOOCH, Sir F. S., Bart., Grosvenor Square, London, "Improvements in regulating the flow of liquids in apparatus employed for reducing such liquids from a higher to a lower temperature." March 3, 1875.

791.—LAWRENCE, J. E., and PORTER, E. V., Westminster, London, "Improvements in centrifugal pumps." March 3, 1875.

793.—JUSTICE, P. S., Southampton Buildings, London, "Improvements in valves." A communication. March 3, 1875.

797.—ELBOROUGH, C. M., King's Arms Yard, London, "An improved meter for liquids." A communication. March 4, 1875.

806.—WIER, M. A., Abchurch Lane, London, "Improvements in the means of igniting gas and in apparatus employed therein." March 4, 1875.

807.—ELCOCK, C., Manchester, "An artificial animal charcoal suitable as a filtering, decolorizing, and deodorizing agent, and for forming into blocks for various purposes." March 4, 1875.

NOTICES TO PROCEED.

3843.—Marchant, R. M., Hatton Garden, London, "Improvements in the manufacture of gas." Nov. 7, 1874.
3847.—Morgan, J. W., Cardiff, "Improvements in annealing retorts." Nov. 7, 1874.
3928.—Richards, W., Brixton Road, London, "Improvements in instruments for measuring fluids." Nov. 14, 1874.
4027.—Harrold, W., West Bromwich, Stafford, "Improvements in gas-stoves." Nov. 24, 1874.
286.—Cory, E., Cardiff, "Improvements in motive-power engines, also applicable to pumps or measures for air, gases, or liquids." Jan. 25, 1875.
396.—Atherton, J., Euston Road, London, "Improvements in joints or couplings for pipes or tubes." Feb. 3, 1875.
761.—Lake, W. R., Southampton Buildings, London, "Improvements in apparatus for regulating the flow of gas, steam, or air." A communication. March 2, 1875.
791.—Lawrence, J. E., and Porter, E. V., Parliament Street, London, "Improvements in centrifugal pumps." March 3, 1875.
812.—Clark, A. M., Chancery Lane, London, "Improvements in pumps." A communication. March 4, 1875.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

5178.—Newton, W. E., Chancery Lane, London, "Improvements in filters for filtering or purifying water and other liquids." A communication. Sept. 17, 1874.
3225.—M'Intyre, J., Renfrew, "Improvements in apparatus for purifying sewage waters." Sept. 21, 1874.
3240.—Malam, W., Kent, and Graves, T., Surrey, "Improvements in apparatus for mixing air with the vapour of liquid hydrocarbons to be used for lighting and heating or for any other purpose, also in the treatment of such hydrocarbons with a view to purifying the same and obtaining a useful product therefrom." Sept. 22, 1874.
3346.—Robinson, F., Essex, "An improved mode of and apparatus for the manufacture of gas." Sept. 30, 1874.
3902.—Quin, J., Lancaster, "Protecting india-rubber valves, tubes, and other like articles from chemical action." Nov. 12, 1874.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

616.—Bablon, V., "Improvements in apparatus for measuring the delivery of gaseous fluid, or other currents." Feb. 28, 1872.
634.—Wallace, J., "Improvements in apparatus for burning gas to produce heat." Feb. 29, 1872.
670.—Underhay, F. G., "Improvements in apparatus for controlling the supply of water to dwelling-houses and other buildings." March 5, 1872.
672.—Exall, W., "Improvements in tube expanders." March 5, 1872.
714.—Avery, C., Pennsylvania, U.S.A., "Improvements in rotary steam-engines and pumps." March 8, 1872.

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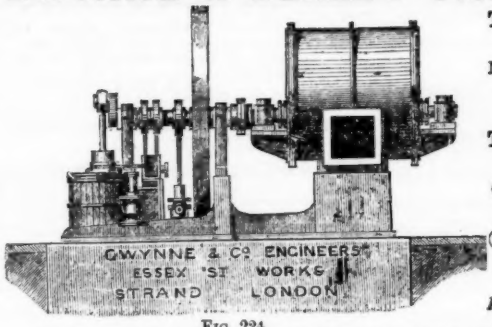

Fig. 224.

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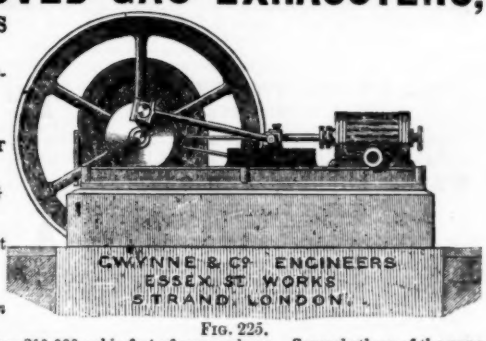

Fig. 225.

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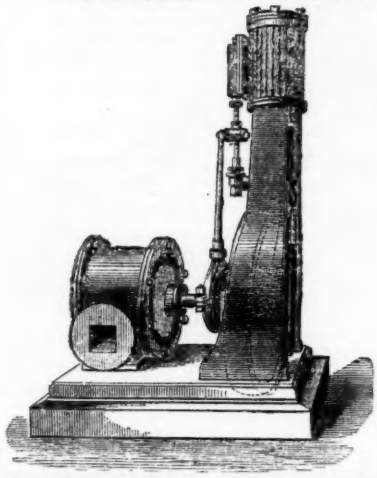

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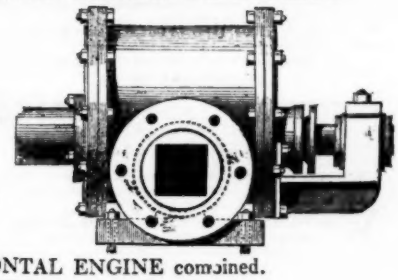

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The JOURNAL OF GAS LIGHTING is supplied direct from the Office to residents, in any part of the United Kingdom, at the rate of 21s. per annum, payable in advance. If credit be taken, the charge is 25s.

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The insertion of Advertisements in the current week's issue cannot be guaranteed unless received at the Office by THREE o'clock p.m. on MONDAY.

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LONDON:
WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, E.C.

For Companies to issue to their Gas Consumers.

ADVANTAGES OF GAS FOR COOKING AND HEATING.

(NEW EDITION.)

By MAGNUS OHREN, A.I.C.E., F.C.S.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

WANTED, by the son of a Gas Manager, a situation as ASSISTANT MANAGER, or the Management of a medium-sized Gas-Work.

Address No. 139, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, aged 30, an engagement as MANAGER or Assistant Manager, or Gas Inspector or Foreman Fitter; 12 years experience.

Apply to E. G., 10, Prospect Hill, Swindon, WILTS.

WANTED, a Service-Layer and Meter-Fixer. Part of his duty would be to superintend the public lamps and assist at the quarterly inspection of meters.

Applications, with references, age, experience, and wages required, to be addressed to the MANAGER, Gas-Works, GLOUCESTER.

WANTED, by the son of a Gas Manager, a situation as MANAGER of Gas-Works. Has had actual charge for two years. Thoroughly practical in fitting, extensions, meters, and general routine of a Gas-Work. Good scholar. Good testimonials, and can be well recommended.

Address No. 147, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Malton Gaslight and Coke Company, a thoroughly competent person to act as SECRETARY and Manager of the Works. Annual make about 16 millions. Security to the extent of £200 will be required.

Apply, in candidate's own handwriting, on or before the 5th day of April next, stating age, qualification, present occupation, and amount of salary expected, to J. S. CRANMER, Secretary.

By order of the Directors.

Malton, March 19, 1875.

WORKING FOREMAN Wanted, in a small Gas-Work in Wales. Wages 25s., with cottage, coal, and gas.

Apply, by letter, stating experience and giving references, to No. 145, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED immediately, at a Gas-Work in the country, a steady and industrious Man as STOKER. Average wages 26s. per week, with constant employment.

Apply to SECRETARY, Gas-Works, Winsford, CHESHIRE.

WANTED, to purchase two good second-hand PURIFIERS, 7 ft. or 8 ft. square, with 6-in. connexions.

Address, SECRETARY, Gas-Works, Winsford, CHESHIRE.

FOR SALE, from 150 tons to 200 tons of COKE.

For price, &c., apply to SECRETARY, Gas-Works, Winsford, CHESHIRE.

SITUATION Wanted, as Working Foreman of Gas-Fitters and Brass Finishers, by a man of experience, who has been sent to all part of England on gas-fitting work. No objection to go abroad.

Address, J. G., 47, Stainsby Road, LIMEHOUSE.

REQUIRED, a practical Gas-Fitter, Main and Service Layer. Capable of repairing wet and dry meters.

Application may be made, stating age and former places of employment, to Mr. T. H. BOUTTELL, Manager and Analyst, Gas-Works, SLEAFORD.

Good wages will be paid to a sober and industrious workman.

THE Andover Gas and Coke Company are in want of a WORKING FOREMAN, a good Fitter and Main and Service Layer, to attend to and repair meters. Able to overlook and direct a local bricklayer in setting retorts, and to make himself generally useful. There is a comfortable residence on the works.

Apply, with testimonials and salary, to Mr. S. SHAW, Andover, HANTS.

A GENTLEMAN, acquainted with the manufacture and chemistry of gas, seeks a situation as SECRETARY and Manager to a small work, or Secretary and Accountant to a larger work. First-class Accountant. Acquainted with the system of manufacture adopted at most of the Gas-Works in England.

Reference to numerous Managers. Testimonials as to integrity, ability, and industry, extending over 20 years. Ten years in an important position with a leading chemical firm.

Address No. 146, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WEST KENT GAS COMPANY.

FOR SALE—348 Iron-Cased Meters, "Cathels and Splats"—viz., 57 3-light, 229 5-light, 50 10-light, 11 20-light, one 30-light.

Can be seen on application to the Manager, at the works at Erith.

Tenders to be sent to the Secretary, R. P. KEYS, 237, SOUTHWARK BRIDGE ROAD, S.E.

FOR SALE—A Cast-Iron Gasholder-Tank, 41½ ft. diameter and 18 ft. deep, with Telescopic Gasholder, columns, girders, &c.

Two Scrubbers, with washers, about 18 ft. high and 6 ft. diameter, with valves, &c., complete.

One 8-h.p. Vertical Engine, with Anderson's Exhauster.

Can be seen at the Consumers Gas Company's Works, WOOLWICH.

STATION-METER FOR SALE.

THE Directors of the Dudley Gas Company, having erected a new meter at their works, have one of 8000 ft. per hour capacity in good condition to DISPOSE OF, with 10-in. hydraulic valves and bye-pass connexions. A low price will be taken.

Gas-Works, Dudley, March 10, 1875.

GAS-WORKS FOR SALE.

IN consequence of retirement from business the undersigned has been entrusted to OFFER for SALE two GAS-WORKS in Tuscany, Italy. Both works are in excellent condition, and are paying good interest.

Full and most reliable information can be had of Mr. STRANGE, Officina del Gas, Prati, Tuscany, Italy.

N.B.—In the vicinity of the works above referred to, Mr. Strange has the offer of illuminating two other cities.

COAL TAR AND AMMONIACAL LIQUOR.

THE Town Commissioners of Tralee invite TENDERS for the TAR and LIQUOR produced at their Gas-Works for One year, from the 12th of April, 1875. The Tar and Liquor to be sold separately, and both at a rate per 100 gallons. The latter according to strength.

Tenders to be sent to me on or before Saturday, the 3rd day of April next, endorsed "Tender for Tar and Liquor."

The Commissioners do not bind themselves to accept the highest or any tender.

JAMES SUEL, Engineer and Manager.

Gas-Works, Tralee, March 18, 1875.

TO IRONFOUNDERS AND OTHERS.

THE Directors of The Gaslight and Coke Company are prepared to receive TENDERS for the supply of 48-inch PIPES, in accordance with a specification to be obtained here on application to the undersigned.

Proposals to be sent in on or before Thursday, the 1st proximo, addressed to me, and endorsed "Tender for Pipes."

By order,
JOHN ORWELL PHILLIPS, Secretary.

Chief Office, Horseferry Road, Westminster, S.W.,
March 18, 1875.

THE Newton-in-Mackerfield Improvement Commissioners invite TENDERS for supplying and fixing four 12-ft. PURIFIERS, Centre-Valve, &c., at their Gas-Works, Crow Lane, where the drawings and specification may be seen on application to the Manager, at the works.

Tenders, endorsed "Tender for Purifiers," to be forwarded to me not later than the 3rd day of April next.

The lowest or any tender not necessarily accepted.

R. BRIERLEY.

Town-Hall, Newton-le-Willows, Lancashire,
March 6, 1875.

The Commissioners will have for disposal four 6-ft. Purifiers, with dry centre-valve and 8-in. connexions, in complete working order, for which offers are invited.

BOLTON CORPORATION—GAS DEPARTMENT

TO GASHOLDER MAKERS.

THE Corporation invite Tenders for a Telescopic GASHOLDER, 102 ft. in diameter.

The drawings and specifications may be seen at the Gas Offices, Bolton, on application to the Engineer, Mr. Harrison Veevers.

Tenders, addressed to the undersigned, endorsed "Gasholder," to be delivered before Monday, the 29th inst.

The Corporation do not bind themselves to accept the lowest or any tender.

R. G. HINNELL, Town-Clerk.

Town-Hall, Bolton, March 8, 1875.

NOTTINGHAM CORPORATION GAS-WORKS.

TO CONTRACTORS.

THE Gas Committee of the Corporation of Nottingham are prepared to receive TENDERS for the construction of a GASHOLDER-TANK at the Basford works. The works will comprise the excavation for the tank (about 150 ft. diameter), the brickwork, stonework, puddling, and other similar works.

Plans and specifications may be seen at the Engineer's Office, George Street, and tenders are to be delivered on or before Saturday, the 3rd of April next, addressed to S. G. JOHNSON, Esq., Town-Clerk.

Forms of tender (on which alone tenders will be received) may be obtained on application.

The Committee do not bind themselves to accept the lowest or any tender.—By order,

M. OGLE TARBOTTON, Engineer.

Gas Offices, George Street, Nottingham.

BOURNEMOUTH Gas and Water Company have the following articles FOR SALE, and are ready to receive Tenders for the same:—

One GASHOLDER, now in use and in good condition, 36 ft. diameter by 14 ft. deep, with columns and girders complete.

Four PURIFIERS complete, with wrought-iron covers, each 8 ft. by 8 ft. by 3 ft. 6 in.; hydraulic centre-valve, connexions, and lifting gear.

The Furnace Fittings, Hydraulic Main, Retort Mouthpieces, Ascension and Dip-Pipes, in connexion with Seven Beds of Retorts, containing 43 Retorts.

One 7-in. Governor; Three 7-in. Valves; Eleven 5-in. Valves; Clay Retorts, new—5 circular, 9 oval; 59 Saddle Lumps for Retort Settings.

The Gasholder is required to be removed at once.

The Purifiers being in use cannot be removed before the beginning of August next, nor the Retort Fittings, &c.

The above may be seen on application at the Works at Bournemouth.

Tenders to be sent to the Secretary, WILLIAM CASH, Esq. 26, Nicholas Lane, LONDON, E.C.

TO GAS APPARATUS MANUFACTURERS AND CONTRACTORS.

THE Directors of the Lofthouse and District Gas Company, Limited, are prepared to receive TENDERS for the erection of GAS-WORKS, at Skinningrove, near Saltburn-by-the-Sea, in the North Riding of Yorkshire.

Specification and drawings may be seen on application to Mr. Alfred Upward, the Company's Engineer, of No. 8, Queen Anne's Gate, Westminster, London, from April 1 to April 7, between 11 a.m. and 4 p.m., or to Mr. John Dennington, Secretary to the Company, of 18, Baxter Street, Grange Road, Middlesbrough-on-Tees, from March 22 to March 30, between 11 a.m. and 4 p.m.

All persons applying to inspect the drawings and specification will be required to deposit a sum of three guineas, which will be returned within fourteen days of the date fixed for the delivery of tenders, provided such person or persons shall send in a *bonâ fide* tender, on or before the 15th day of April, 1875, otherwise the sum will be forfeited.

Sealed tenders, endorsed "Tender for the erection of Gas-Works," must be sent in, in accordance with the form given at the end of the specification, not later than the 15th day of April, 1875, addressed to the directors of the Lofthouse and District Gas Company, Limited, 18, Baxter Street, Grange Road, Middlesbrough.

The Directors do not bind themselves to accept the lowest or any tender.—By order of the Board,

JOHN DENNINGTON, Secretary.

ALFRED WILLIAMS,

PHŒNIX FIRE-BRICK WHARF,

64, BANKSIDE, SOUTHWARK, LONDON, S.E.

GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

LIME SUPERSEDED

IN THE

PURIFICATION OF ILLUMINATING GAS

BY

SPENCE'S PATENT DRY COPPERAS.

The only purifying material which removes by one process, without injury to the purifiers, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of five years at some of the largest Gas-Works in the Kingdom.

TESTIMONIALS SENT ON APPLICATION TO

SPENCE BROTHERS CHEMICAL COMPANY, LIMITED,

VICTORIA CHEMICAL WORKS, BRADFORD, MANCHESTER;

SOLE MANUFACTURERS OF SPENCE'S PATENT DRY COPPERAS, SPENCE'S PATENT GAS DEODORIZER, AND MUDIE'S DISINFECTANT;

MANUFACTURERS OF

SULPHATE OF AMMONIA, VITRIOL, COPPERAS, &c.;

PURCHASERS OF SPENT OXIDE AND AMMONIACAL LIQUOR, AND CONTRACTORS FOR THE PURIFICATION OF COAL GAS.

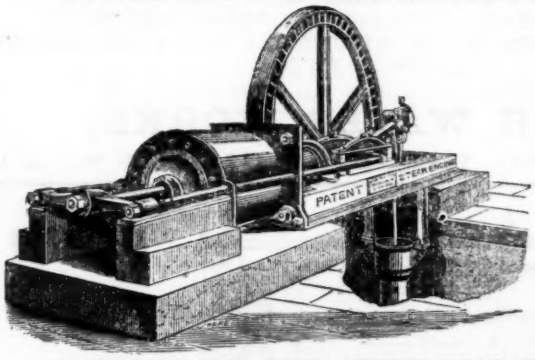
ECONOMY OF FUEL IN STEAM-ENGINES.

B. DONKIN & CO.,

PATENT HORIZONTAL COMPOUND CONDENSING

STEAM-ENGINES,

APPLICABLE FOR DRIVING GAS-EXHAUSTERS.



These Engines have been at work a sufficient number of years to prove their durability and efficiency.

One of them has been subjected to a scientific and exhaustive trial to test the consumption of fuel, with the result that an expenditure of less than 2 lbs. of coal per hour developed one indicated horse power.

Full Details of this Trial, and Prices, sent on application to

B. DONKIN & CO., BLUE ANCHOR ROAD, BERMONDSEY, S.E.

NOTICE OF REMOVAL.

CAFFALL, THOMAS, & CO., LIMITED,

MANUFACTURERS OF THE

PATENT MOVEABLE SEAL

FOR DIP-PIPES,

Have REMOVED from 28, GRACECHURCH STREET, to

City Office: 75, FLEET STREET, E.C.

Works: 8, MEDWAY BUILDINGS, ROMAN RD., OLD FORD, E.,

Where Models may be seen and every information obtained from

W. D. CHILD, Manager.

PHŒNIX GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the ADJOURNED HALF-YEARLY GENERAL MEETING of PROPRIETORS holding, previous to the 31st of December last, £300 paid-up capital and upwards in the said Company, will be held, pursuant to the Act of Incorporation, on WEDNESDAY, the 7th of April, at Two o'clock precisely, at the Bridge House Hotel, in the Borough of Southwark, for the purpose of declaring Dividends to the 31st of December last, to elect Directors and Auditors for the ensuing year, and on other business.

The Transfer Books will be closed on and after the 25th inst., and opened on the 8th of April.

By order of the Court of Directors,

ISAAC ADOLPHUS CROOKENDEN, Secretary.

70, Bankside, London, S.E., March 12, 1875.

THE LONDON GASLIGHT COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY MEETING of the Proprietors of the Company will be held at the Freemasons Tavern, Great Queen Street, Lincoln's Inn Fields, on WEDNESDAY, the 14th day of April, 1875, at Twelve o'clock precisely.

Three Directors and one Auditor retire by rotation, and, being eligible, offer themselves for re-election.

The Transfer Books will be closed on Tuesday, the 30th day of March, until after the meeting.

By order of the Board,

A. J. DOVE, Secretary.

Dated this 17th day of March, 1875.

MEMORANDUM.—Proprietors must hold capital stocks, or shares paid up to the amount of £250, to be qualified to attend the meeting.

R. ANDREWS, Contractor for Setting and Repairing Brick, Iron, and Clay Retorts, and Gas Ovens. References and prices on application.

Address R. ANDREWS, 4, Broomfield Cottages, Bowes Road, Southgate, LONDON, N.

TO MAKERS OF GAS PURIFYING WOOD SIEVES.

WE are prepared to supply Wood WASHERS for going between bars, either parallel or bevel, in quantities made by special machinery, on moderate terms to the trade.

For prices and terms, apply to the Foyle Bobbin and Turning Works Company, New Buildings, near Londonderry, IRELAND.

IMPORTANT TO WATER COMPANIES, PLUMBERS, &c.

PATENT APPARATUS FOR MAKING CONNEXIONS TO WATER SERVICES DURING FULL PRESSURE.

GEORGE BATES, Hydraulic Engineer, High Street, Lewes, offers his newly-patented efficient APPARATUS for Inserting and Soldering Valves, Cocks, &c., to Lead and Iron Water Services, where there is a constant supply and at full pressure. By this small apparatus the work may be thoroughly done in a short time without the loss of water, being invaluable where constant service is supplied.

Prices, &c., on application to the PATENTEE.

Lewes, Sussex, March 1, 1875.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 47 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

WATER-MAINS.

COTTERILL'S PATENT STEEL TUBE-DRILLS, for connecting services to water-mains, *under pressure*, without turning off the water. They drill and tap themselves, and are left in the mains. Made of all sizes, from ¾ to 2 inches and upwards. They cost less than the ordinary plan.

Apply to CHARLES FORSTER COTTERILL, Cannock, STAFFORD, Patentee.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.

South Shields. W. J. WARNER.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 16 oz., cost of production £1000.

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

C. & W. WALKER,

MIDLAND IRON-WORKS,

DONNINGTON, NEAR NEWPORT, SHROPSHIRE,

MANUFACTURERS OF

TELESCOPIC AND SINGLE-LIFT

GASHOLDERS,

CAST & WROUGHT IRON GASHOLDER-TANKS,

CONDENSERS, SCRUBBERS, & PURIFIERS.

LONDON: 8, FINSBURY CIRCUS, E.C.

Mr. NORWOOD EARLE,

GAS SURVEYOR,

12, QUEEN VICTORIA STREET, E.C.,

Advises on all matters connected with the Distribution of Gas, Public Lighting, Gas Testing, &c.

Valuations made for Assessment and other Purposes.

Mr. HENRY GORE,

CONSULTING GAS ENGINEER,

9, ISLIP STREET, KENTISH TOWN, LONDON, N.W.,

May be consulted on all matters relating to the Manufacture and Distribution of Gas, including Inspection and Reports on Works, Foreign Concessions, Patented or other Processes.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

WM. RICHARDS,

INVENTOR OF THE DRY GAS-METER,

REVISER OF "HUGHES ON GAS-WORKS,"

CONSULTING GAS ENGINEER,

Advises on all matters of business connected with Gas Lighting. Furnishes Working Drawings of Retort-Settings, Specification of Works, complete or in detail.

11, ST. MICHAEL'S ROAD, STOCKWELL, LONDON, S.W.

GAS COMPANIES ACCOUNTS.

EDWARD SANDELL,

PUBLIC ACCOUNTANT,

The Projector of the Gas Companies Analyzed Expenditure Account Book, having had twenty years experience in opening, keeping, auditing, and investigating Gas Companies Accounts, offers his services for similar purposes, and also in preparing Financial and Statistical Accounts for Arbitrations or Parliamentary Applications. References to numerous Gas Companies and the most eminent Consulting Gas Engineers.

4, Skinner's Place, Queen Victoria Street, LONDON.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, WESTMINSTER.

THOMAS ALLAN & SONS, of Springbank Iron-Works, Glasgow, manufacture small cast-iron GAS AND WATER PIPES, 1½ to 6 inches, at their branch works, Stockton-on-Tees, and have at present a large stock, which they are open to sell at moderate prices.

GARSIDE'S IMPROVED REGISTERED TUBE-VICE, holds all sizes of Wrought-Iron and Brass Tubes, from a 2-in. socket to the smallest brass tube made.

GARSIDES IMPROVED MAIN DRILLING CLIP, made in two sizes, to drill from 2-in. to 6-in. Mains, and from 6-in. to 12-in. Mains.

The above tools are made light and handy.

For drawings, &c., apply to the maker, SAMUEL GARSIDE, Gatefield Iron-Works, ASHTON-UNDER-LYNE.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Agent in London, Mr. J. MANWARING, 101 Cannon Street E.C.

PATENT FUEL AND LIME FOR PURIFYING FROM FOUL LIME.

By a simple process the Foul Lime is converted into Fuel, by the combustion of which the lime is reproduced as a purifying agent.

Licences to work the invention will be granted to Gas Companies on very reasonable terms.

For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.

The adoption of the above invention, without a licence from the Patentee, will be an infringement of the patent, and will subject the person or company guilty of such infringement to legal process.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20 & 22, WHARF ROAD CITY ROAD, LONDON, N.,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

TO GAS COMPANIES AND THE TRADE.

J. DEFRIES & SONS,

MANUFACTURERS OF

CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, VESTIBULE LAMPS, AND THE PATENT CRYSTAL ILLUMINATION.

A LARGE STOCK ALWAYS IN HAND OF

IRON, BRASS, COMPOSITE, AND LEAD TUBES, FOR GAS AND WATER,

AND EVERY DESCRIPTION OF

GAS AND WATER FITTINGS.

THE PATENT DRY AND WET METER, WITH THE LATEST IMPROVEMENTS.

STREET LAMPS AND COLUMNS IN GREAT VARIETY.

WORKS: LONDON AND BIRMINGHAM.

GAS MOONS,
Cut and Engraved, of the newest designs

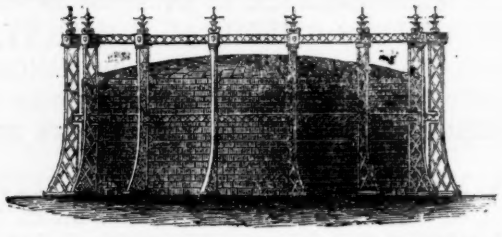
GAS REFLECTORS
In Silver and Glass

GAS NIBS
AND
BURNERS
Of every description.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1873, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.

ESTABLISHED 1830.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

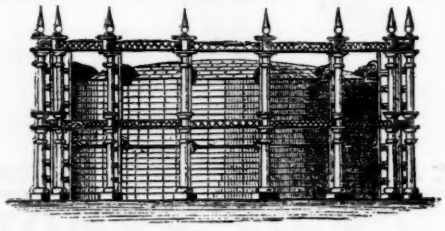
AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,

GAS ENGINEERS & CONTRACTORS,

MANUFACTURERS OF GASHOLDERS,

GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,

And GENERAL IRONWORK.

N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

J. & J. BRADDOCK,

GAS ENGINEERS,

GLOBE METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET & DRY CONSUMERS GAS-METERS

OF THE HIGHEST EXCELLENCE;

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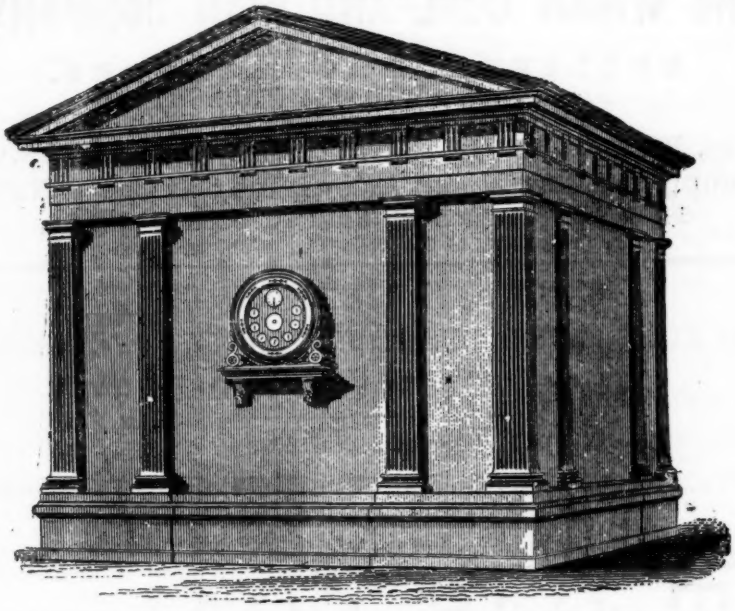

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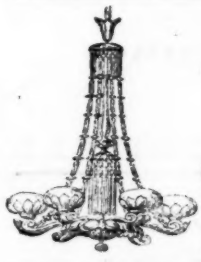

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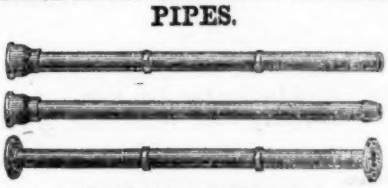

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Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—
(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.
Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.
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This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.
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1. The following are the practical results given by Dr. Wallace, of Glasgow, of analyses of their Lochore and Capledrae Cannels:—

	Sample worked at Capledrae.	Sample worked at Lochore.
Gas per ton of coal, at 60° Fahr. and 30 inches barometric pressure	13,095 cubic feet.	11,760 cubic feet.
Illuminating power, in standard sperm candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	32·91	34·83
Value of 1 cubic foot of gas in grains of sperm	780	836
Equivalent of a ton of coal in pounds of sperm candles	1,459	1,404
Durability of 1 cubic foot by 5-inch flame	69 minutes.	71 minutes.
Gravity of the gas (air = 1000)	596	594

Remarks.—This (the sample from Capledrae) is a Cannel Coal of first-class quality, giving 13,000 feet of 33-candle gas. It contains only a minute proportion of sulphur, and the ash is almost quite white. The coke is of rather inferior quality.

Remarks on Sample from Lochore.—This is a Cannel Coal of first-class quality, giving a large yield of very rich gas and a coke of medium quality.

2. The following are the practical results of analyses by Dr. Wallace of the Company's Waverley Cannels:—

	Capledrae Waverley.	Lochore Waverley.
Gas per ton of coal, at 60° Fahr. and 30 inches barometer	9,120 cubic feet.	11,145 cubic feet.
Illuminating power, in standard candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	36·62	33·09
Value of 1 cubic foot of gas in grains of sperm	878	794
Equivalent of a ton of coal in pounds of sperm candles	1,145	1,264
Durability of 1 cubic foot of gas by 5-inch flame	80 minutes.	67 minutes.
Gravity of the gas (air = 1000)	677	597

Remarks on the Sample of Capledrae Waverley.—This Coal gives fully 9000 feet of gas of 36½ candles, and is admirably adapted for bringing up the quality of gas made from common coal or inferior qualities of cannel. The tests were made at a rather high temperature, this being one of the coals that stand a very high heat without serious diminution of the illuminating power of the gas The coke contains 60 per cent. of ash, and is therefore almost valueless, but the proportion of sulphur is very moderate.

Remarks on the Lochore Waverley.—This is a first-class Cannel Coal, giving 11,000 cubic feet of 33-candle gas. The quantity of sulphur is very minute, and the ash is nearly white. The coke is of inferior quality, but not wholly valueless.

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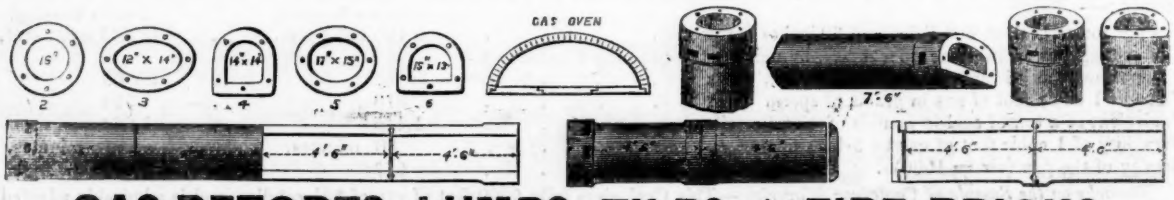

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